THE GAS JOURNAL

FEBRUARY 21, 1934

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A Glance at the Contents—

Manager Needed.

A manager is required for a gas-works having a make of 18 million c.ft. a year. [p. 507.]

Engineer and Manager Required.

A Gas Company in Cornwall invites applications for the position of Engineer and Manager. [p. 507.]

Gas Company Meetings.

Reports are published of the Annual General Meetings of the Mid-Southern Utility Company and the Bournemouth Gas and Water Company. [pp. 500 and 501.]

Klönne Gasholder at Port Talbot.

A waterless gasholder of 2 million c.ft. capacity is being erected at Port Talbot for storage of the gas from the blast furnaces at the Margam steel works. [p. 464.]

New Dry Purification Process.

A new intensive method of dry purification is described, invented by Raffloer, and working on a semi-large scale at the Concordia Colliery, Oberhausen. [p. 465.]

Carbonization in Semi-Intermittent Verticals.

Mr. E. L. Wallis, of Dudley, discussed the subject of carbonization in semi-intermittent vertical retorts, before a meeting of the Midland Junior Gas Association. [p. 493.]

The Washing of Gas.

The joint discussion is published on the paper by Messrs. Hollings & Silver, given in the "JOURNAL" for Feb. 7, and that by Mr. Silver which appeared last week. [p. 496.]

National Gas Council.

A Meeting of the Central Executive Board of the National Gas Council was held at 28, Grosvenor Gardens, London, S.W. 1, on Feb. 13, the chair being taken by Mr. William Cash, F.C.A., J.P. [p. 466.]

Exhibits at the B.I.F.

An illustrated description covers all the exhibits in the Gas Industries Section of the British Industries Fair at Castle Bromwich, and also other stands at the Fair likely to prove of interest to our readers. [p. 469.]

Installing Domestic Gas Water Heaters.

In a paper before the Wales and Monmouthshire Junior Gas Association, Mr. F. Robertson, of the Cardiff Gas Light and Coke Company, made some practical observations on installing domestic gas water heaters. [p. 498.]

Water Gas.

A review of Vol. 1 of "The Manufacture of Gas," edited by Mr. H. Hollings, of the Gas Light and Coke Company, is published. The book deals with Water Gas and is written by Dr. R. H. Griffiths, and there is a section on Temperature Measurement by Mr. H. C. Excell. [p. 466.]

London and Counties Coke Association.

A report is published of the proceedings at the second annual general meeting of the London and Counties Coke Association. Last year 152 members in the area, which covers London and the surrounding eleven counties, produced for inland sale approximately 2,603,000 tons of coke, representing over 90% of the total coke produced within the area. [p. 467.]

Forthcoming Engagements

Feb. 22.—B.I.F.—Visit of Joint Junior Gas Associations.

Feb. 23.—B.I.F.—Gas Salesmen's Day.

Feb. 24.—WESTERN JUNIOR ASSOCIATION.—Meeting at Bristol. Paper by Mr. C. H. Chester.

Feb. 27-March 1.—B.I.F.—Joint Gas Conference.

March 8.—MIDLAND JUNIOR ASSOCIATION.—Meeting. Paper by Mr. H. J. Reynolds.

March 10.—WESTERN JUNIOR ASSOCIATION.—Meeting at Plymouth. Paper by Mr. A. R. Langford.

March 10.—SCOTTISH JUNIOR ASSOCIATION (WESTERN DISTRICT).—Annual Business Meeting. Paper by Mr. H. S. Milne.

March 14.—I.G.E.—Meeting of Meters Committee, 2.30 p.m.

March 14.—YORKSHIRE JUNIOR ASSOCIATION.—Joint Meeting at Warrington with Manchester and District Juniors. Paper by Dr. Winter.

March 16.—LONDON AND SOUTHERN JUNIOR ASSOCIATION.—Meeting. Paper by Mr. L. T. Minchin.

March 24.—YORKSHIRE JUNIOR ASSOCIATION.—Meeting at Batley.

March 27.—SOUTHERN ASSOCIATION.—Annual General Meeting, Hotel Metropole, London, 2 p.m.

April 6.—NORTH BRITISH ASSOCIATION.—Spring Meeting at Perth.

1934 "JOURNAL" Directory.

Page 8. BODMIN. R. Greenaway, E. & M., deceased.

Page 62. SOUTH SUBURBAN. Officers should read W. Wastell, G.M.; T. Brown, S.; V. Simmonds, E. (Works); J. A. Gould, E. (District).

EDITORIAL NOTES

Co-Operation

IN these columns last year, giving a few of our impressions of the Birmingham Section of the 1933 British Industries Fair, we headed our comments " Bigger and Better." This year, since we have visited the Fair, that title would still be apposite. Statistics are apt to be fickle playthings which tantalize without purpose, but a few figures about the British Industries Fair cannot mislead and should prove interesting. The indoor area of 264,418 sq. ft. this year compares with a total allotment of 244,374 sq. ft. at the 1933 Fair, and 85,000 sq. ft. in 1920 when the Birmingham Section was inaugurated. The Gas Industry's Section is now one of six trade groups, but it is by no means the least important, and in more ways than one its organization and arrangement have paved the way to a better distribution of exhibits and more attractive display throughout the Fair as a whole. Even the most casual visitor to the Fair must be struck with the unity of the Gas Industries Section. It is, in fact, the only section having a definite colour scheme. The national bodies of the Gas Industry—the National Gas Council, the Institution of Gas Engineers, the British Commercial Gas Association, and the Society of British Gas Industries—have in this matter had the whole-hearted co-operation of the numerous individual firms which have lent their support, very wisely, to an effort of first-class importance inaugurated six years ago, and which has gone from strength to strength.

The colour scheme may be described as warm—a fitting tone for Mr. Therm. The displays, more attractive than ever before, are bright with chromium plate and new and better colour-enamels—here again symbolic of the convenience and cleanliness of gaseous fuel. As far as the Gas Industry is concerned the manufacturers, besides knowing how to make, know how to set out their wares to appeal to the public, and we are sure that those who visit the 1934 Fair will be afforded convincing proof that gas is a fuel of to-day and to-morrow, as well as of yesterday. There are certainly two direct appeals to the housewife: First, that whatever her ideas may be on decorative schemes and furnishing the Gas Industry is able to offer her appliances for lighting, cooking, heating, and water-heating which will fit in with those ideas; secondly, that most important item of convenience is admirably emphasized in the Gas Industry's Section. The switch-operated lighting, the gas fires—matchless fires these are—which require nothing more than the turn to a tap to become radiantly cheerful, water-heaters similarly which but require a turn of the hot water tap (and the word " hot " is meant), cooker hotplates with automatic ignition; these are but examples selected at random to make our point clear. The Gas Section gave a lead to the British Industries Fair; and it gives a lead to-day. During our visit to the Fair someone in no way connected with either the gas or the electricity industry made an interesting comment. He said he was amused to find that the electricity industry really did help the Gas Industry; it fulfilled a useful purpose in igniting the gas fire.

H.R.H. The Duke of York,

At the Mansion House Banquet to celebrate the opening of the Fair:

It is perhaps a good thing to remind ourselves that the development of the British Industries Fair has taken place during a period of change without precedent in economic history. The first few years of the Fair's life saw a great boom in world trade, followed by a depression which increased in its tragic effects until commercial and industrial prosperity began to leave the world. But throughout these latter years, our National Trade Fair has kept its course, growing in scale and effectiveness with each passing phase.

To-night we are celebrating the opening of the biggest Fair which has been held since the first British Industries Fair in 1915. I think we can derive quiet satisfaction from the apparent paradox between the continual expansion of the Fair and the circumstances in which that expansion has taken place. Among other things it shows that we do attach value to advertising when times are bad.

* * * *

The forces which have held the world in bondage are slackening. The beginnings of a revival of trade are taking their place. In this country, we were able last year to reduce the number of unemployed by more than half-a-million, and though there may be ups and downs, the downward tendency, which marked the activities of most of our Industries, is in process of being checked, and there is evidence of a definite upward movement. But we have to remember those workers and machines which are still idle; the numbers of our people who are still denied the opportunities of a fuller life.

The road to recovery is no easy one. And the progress we make depends not only upon using those qualities which adversity has developed in us, but upon our being able to sweep away many of those prejudices, restrictions, narrow, insular points of view, which can slow down progress. Recovery, if it is to come about, calls for an attitude of mind and a breadth of outlook which were, perhaps, unnecessary in the days when it was easy to sell if one knew how to make.

* * * *

Let us resolve that this year shall be one of courage and boldness; with readiness to take risks and thus achieve that degree of prosperity which surely the world's resources put within our reach.

Competition

WE have spoken about co-operation. An outstanding instance of this is to be found in the Joint Industrial Exhibit arranged by the British Commercial Gas Association and in which the gas undertakings of Birmingham, Sheffield, and Newcastle collaborate to such good effect. A prototype of this co-operative display was inaugurated at the 1933 Fair, but on a much smaller scale. The present exhibit, with the various pieces of apparatus well laid out and wisely selected, is a convincing argument of the important part which gas is playing in industry to-day, and of the still more important rôle it is destined to fulfil. In every sense it is a live display; the appliances are in operation, and even the most doubting manufacturer will after visiting this stand cease to be named Thomas. The outcome of vigorous and fruitful research on combustion, heat treatment, controlled atmosphere, thermostatic regulation, is excellently demonstrated by this display. Six years ago when the Gas Industry combined as an Industry to exhibit at the Fair they took 16,000 sq. ft. of space. At the present Fair the area covered is 47,250 sq. ft. These cold figures are an indica-

tion only of the progress made by the Industry in its recognition of the value of display—the necessity of telling the world about an essential public utility service.

Our readers know what "Class A" lighting means; they also know more than the general public of how gas can meet the requirements of this and all other types of public lighting. To demonstrate this—and a very fine demonstration it is—a commencement has been made on a portion of the road on one side of the Fair which will eventually encircle it. To date, 300 yards of the road has been laid, and it has been lighted by low-pressure gas lamps to come well within Class A Specification. The arrangements for this lighting have been made through the instrumentality of the Gas Industries Section Committee—75,000 candle-power well supplied by modern gas street lighting units. This, of course, does not mean that we have the field clear, in spite of the illumination.

From fog into fog we arrived at Castle Bromwich, and along the avenue leading to the various sections of the Fair were modern concrete pillars carrying the latest form of illumination which the electricity industry has to offer; we refer to the mercury vapour lamp. This is competition which the Gas Industry has to face. Inside the building of the Fair we were more impressed than ever before with competition from electricity. A feature of the Gas Industries Section has been the Information Bureau of the British Commercial Gas Association and collaborating firms, which has enabled the "Service First" principles of our Industry to be so well advertised. At this year's Fair the British Electrical Development Association has an information bureau which we may call plagiarism, but which is certainly excellent plagiarism. The lighting effects and the whole skilful arrangement of the E.D.A. Bureau are indicative of the force of competition from one single industry which the Gas Industry will have to face during the twelve months which elapse before once again we are displaying our wares at Castle Bromwich. We hope that when our readers visit the Fair they will spare a few moments to examine the electrical section. And then when they return to their undertakings, having realized what splendid apparatus the Gas Industry has to offer, they will think for a few minutes of the titles of these few notes on the 1934 Fair, and will determine, with renewed faith, to redouble their efforts to meet competition which the Gas Industry has not seen before.

More Good Results

FOLLOWING upon the satisfactory results reported in last week's "JOURNAL," in connection with the annual meetings of a number of important gas companies, we are able in this issue to give further gratifying tidings from other quarters. There appears to be peculiarly small reason for any feelings of pessimism in connection with "accounts of their stewardship" for the year 1933 which have so far been given by Boards of gas undertakings.

At the meeting of the Mid-Southern Utility Company, Mr. R. W. Edwards was able to report that, with a big advance in sales on the electrical side of the undertaking, and with an unusual proportion of fine weather, the sales of gas disclosed a decrease of no more than one-half per cent. for the past year, while, with the colder weather since the arrival of 1934, an improvement this year appeared to be indicated. Claiming to be among the oldest members of the Gas Industry, Mr. Edwards "unhesitatingly declared his unswerving confidence in its future," and urged that the Industry "must move in one consolidated mass, with full confidence." This is the spirit which helps both men and industries past obstacles; without such faith, the maximum of effort can scarcely be hoped for. Mr. Edwards's view that there should be in the Gas Industry as great a degree of solidarity as appears to exist on the electrical side, is a sound one. This, also, is essential to the greatest possible degree of success.

A decrease in the sales of gas of less than one-half per cent. was experienced by the Bournemouth Gas and Water Company in the past year, but, as Mr. William Cash pointed out at the meeting, in the December quarter, with its somewhat severe weather, there was an increase in sales of practically 5½%. There is encouragement here, again, to hard work and earnest endeavour.

Dry Purification

ON a later page will be found a description of a new intensive method of dry purification invented by Raffloer and working on a semi-large scale at the Concordia Colliery, Oberhausen. The process, it is claimed, combines the advantages inherent in dry purification with a small ground-space requirement, and permits of recovery of elementary sulphur in a very simple manner. In the new system, towers replace boxes, and the oxide is employed in the form of specially prepared balls which, besides being very strong, have the high internal porosity of 60%, which renders them permeable to the gas. When one tower is fouled, the gas is diverted to the other tower. Absolutely complete removal of sulphuretted hydrogen is claimed; and on the basis of treating 3½ million c.ft. of gas a day, the ground-space occupied by the plant would be 30 square yards, compared with 240 square yards in the case of box purifiers. The oxide discharged from the tower and saturated with sulphur is extracted with carbon disulphide for recovery of the sulphur, and retains its spherical form during this operation. Again on the basis of treating 3½ million c.ft. of gas per 24 hours, with an H_2S content of 380 grains per 100 c.ft., the net cost of purification is given as 0·062d. per 1,000 c.ft.

Standardizing Home Colours

REFERENCE was made in the "JOURNAL" dated Jan. 31 (page 242) to the fact that, with the object of remedying what they felt to be an undesirable state of affairs, the Household Appliances Section of the London Chamber of Commerce had decided, after careful consideration, to recommend to manufacturers included in that Section proposals for the standardization of a limited number of colours. The subject was discussed at a luncheon, at which Mr. G. E. W. Crowe, the Chairman of the Household Appliances Section, referred with pleasure to the manner in which the Gas Industry had supported the movement. It was thought that it would be well if a standard colour card were made available, showing the twelve principal colours used in the household appliances trade; and so that the selection might be made by an independent authority, the Section invited the British Colour Council to choose a dozen colours from their range of standard colours specially suited to the purpose in view.

A card showing the twelve standard colours for household appliances for the season 1934-35 has now been prepared, and manufacturers throughout the country can buy this card in any quantities. The colour card is copyright, but arrangements have been made for overprinting with the name of the distributing firm, at a small additional charge. Orders for the cards should be addressed to the Secretary, Household Appliances Section, London Chamber of Commerce (Inc.), 97, Cannon Street, London, E.C. 4, and the prices range downwards from 2s. 6d. per single copy.

It is recognized by the Section that such a scheme as is being launched can only succeed with the close co-operation and whole-hearted support of the manufacturers, and this support we are sure will be forthcoming—particularly in view of the fact that the adoption of these standard colours by manufacturers will not preclude them from supplying articles in other colours. As we pointed out in our previous reference to the matter, the possibility of even more colouring of household appliances taking place than has already been the case, must be taken into account; and if matching or contrasting is to be attempted the value of standardization of colours, if it can be closely worked to, becomes apparent.

PERSONAL

Mr. D. C. Cross, Engineer and Manager to the Lea Bridge District Gas Company, has been transferred to full Membership of the Institution of Civil Engineers.

* * *

Mr. William Scott, Tillicoultry, has been appointed Assistant Engineer and Manager to the Hamilton Corporation Gas Department. Mr. Scott is the President of the Eastern District of the Scottish Junior Gas Association.

* * *

After 53 years' untiring service to the Shanklin Gas Company, Mr. Frank C. Taylor, the Engineer, Manager, and Secretary, is retiring on April 30 next. His association with the Company dates back to 1881, and it was upon the death of Mr. W. Sutherland, the Secretary, in 1892, that he was appointed to the dual office of Secretary and Manager. Mr. Taylor will be succeeded by Mr. Leslie G. Payne, M.Inst.Gas E., who was Manager and Secretary of the Ventnor Gas and Water Company, recently acquired by the Shanklin Undertaking.

OBITUARY

Mr. Reginald James Greenaway, Engineer and Manager of the Bodmin Gas Company, died at his home, Penrhita, Bodmin, on Feb. 10, after a brief illness, at the age of sixty-three years. Mr. Greenaway leaves a widow, two sons, and a daughter.

Employees of the Bodmin Gas Company acted as bearers at the funeral on Wednesday, Feb. 14, at which there was a large attendance of Mr. Greenaway's business associates, including the Directors and staff of the Bodmin Gas Company.

THE NEWS OF THE WEEK

Altrincham Gas Company.—A dividend of 4⅝% on the original shares and 3½% on the new shares of the Company has been paid, making with the interim dividend paid in August, 1933, 9¼% and 7% respectively for the year ended Dec. 31, 1933.

A Special Conference of the Illuminating Engineering Society will be held at the British Industries Fair, Castle Bromwich, at 3 p.m. on Feb. 22, when an address entitled "Artificial Lighting: A Vista of the Future," will be delivered by the President, Mr. C. W. Sully.

"**Thermal Appliances, Ltd.,**" has been registered as a limited liability Company in London for the purposes of the manufacture and marketing of appliances for heating water by gas in various appliances such as geysers. Capt. W. J. Liberty has joined the Board as Director.

The "Artificial Moonlight" effect of the new electrical lighting system in Lewisham has caused a protest from the local Lighting Vigilance Committee formed by women residents. It is stated that the new lighting causes faces to look grey and haggard, while butchers object on the grounds that it makes their meat look green.

The Bingley Lighting Committee recommends the adoption of an optional two-part tariff scheme of charges for gas to industrial and domestic consumers, to come into operation as from July 1 on a twelve months' trial. Those who accept the tariff will do so subject to giving six months' notice of intention to discontinue taking advantage of the system.

In Addition to the Usual Contribution from the profits of the gas undertaking of £11,400 towards the interest and sinking fund on Belfast City Hall, the Gas Committee have voted £11,000 towards meeting the exceptional expenditure necessitated on outdoor distress relief schemes, making a total of £22,400. This is the second year the extra grant has been made.

The Nantwich Gas Department have decided to reduce the price of gas charged to consumers by means of graduated rebates. The rebate on consumption up to 2,000 c.ft. is 3d. per 1,000; from 2,000 to 4,000, 5d. per 1,000; from 4,000 to 6,000, 7d. per 1,000; from 6,000 to 10,000, 9d. per 1,000; from 10,000 to 20,000, 1s. per 1,000; from 20,000 upwards, 1s. 6d. per 1,000. These concessions will cost the undertaking £1,600 a year.

The Redcar Corporation have commenced to take gas from the Warrenby coke ovens of Messrs. Dorman Long & Co., and which they are able to buy in bulk cheaper than the Corporation have been able to manufacture at their own gas-works. The Corporation gas-works, however, are to be used as a distributing centre not only for Redcar but for all the Saltburn Urban Council's area. Care will be taken that the plant is kept in condition and ready for work in an emergency.

Employees of the Green Line have given their opinions regarding street lighting and expressed perturbation at the conditions prevailing in Romford. Adverse comment was made on the "daylight" system of electric lighting in operation in other districts, but favourable mention was made of the gas installation in London Road, Romford, which was described as the best lighting outside the city of London.

Town Council and Street Lighting Experiment.

Gas Company's Offer Rejected.

When a recent offer of the Eastbourne Gas Company to erect, supply, and maintain gas lighting in a street in the town for twelve months free of charge to the Corporation, the Electricity Committee, who are responsible for the street lighting, reported that, while they appreciated the Gas Company's offer, they regretted they were unable to accept it.

Councillor Addison moved, as an amendment, that the offer be accepted subject to certain conditions. If the electricity undertaking had been in private hands, and the Corporation had received that letter from the Gas Company, he thought it fair to assume that the Corporation would have taken advantage of the generous offer. Because the electricity undertaking happened to be owned by the Corporation was not a valid reason for not accepting the Gas Company's offer. There were positions in street lighting in which gas was undoubtedly better than electricity.

Alderman Knight, seconding, said that as a Council they were interested in but one thing, and that was to get the best possible illumination. The gas lighting in some of the London streets was really amazing. The Gas Company had something to show in which they thought the Council would be interested. The Company was not asking the Council to scrap the existing lighting, but to be given the opportunity to demonstrate the improved methods of street lighting by gas. Therefore he could not understand why the offer had been rejected by the Electricity Committee—the more especially as the Gas Company was a large ratepayer and gave employment to a large number of men.

Councillor Weller Kent hoped that the Council would vote for the amendment. Having referred to the occasional failures of electricity, he reminded the Council that there was at present a Bill before Parliament designed to stop the "tyranny and despotism" of those municipalities which, owning the electricity undertakings, refused to have anything but electricity on their housing estates. Many people were of the opinion—and he was one of them—that they had not done with gas as an illuminant.

Councillor Miles Thompson said it was a very enterprising offer and would cost nothing to accept. Before the Council came to any decision it was important to know all about the cost of street lighting by gas, and from that

point of view the important decision would have to be reached not now but in twelve months' time.

The amendment was defeated by 17 votes to 12.

We understand the Gas Company are making a fresh offer to the Council.

Examinations of the Institution of Gas Engineers, 1934.

The Examinations of the Institution of Gas Engineers in Gas Engineering will be held on April 28 and in Gas Supply on May 5. The Oral Examinations will be held on June 27.

Forms of Application for External Candidates can be obtained from the Secretary of the Institution, and have to be returned not later than Feb. 28.

Candidates for the Diploma Examinations in Gas Engineering (Manufacture) and Gas Engineering (Supply) are eligible for the award of the Charles Hunt Memorial Medals.

Education Calendar, 1934.

The following dates are of special interest to Examination Candidates, who are reminded that the Gas Education Committee meets on the second Tuesday in every month to consider applications from students received during the preceding calendar month.

FEB. 28.

Last date for receipt of applications to sit for the Diploma Examinations
Last date for receipt of applications to sit for the Ordinary and Higher Grade Examinations in Gas Engineering and Gas Supply.

APRIL 2.

Last date for receipt of Diploma Theses.

APRIL 28.

Examinations in Gas Engineering—
Ordinary Grade, 2–5 p.m.
Higher Grade – Part I., 2–5 p.m.
Part II., 6–9 p.m.
Diploma (Manufacture)—Part I., 2–5 p.m.
Part II., 6–9 p.m.

MAY 5.

Examinations in Gas Supply—
Ordinary grade, 2–5 p.m.
Higher Grade – Part I., 2–5 p.m.
Part II., 6–9 p.m.
Diploma (Gas Engineering Supply)—Part I., 2–5 p.m.
Part II., 6–9 p.m.

JUNE 27.

Oral Examinations in London.

JUNE 30.

Last date for receipt of Examination Results in Ancillary Subjects.
Results received after this date cannot be considered for the 1934 Examinations.

JULY 2 TO 6.

Short Course for Teachers in Gas Engineering and Gas Supply at the Westminster Technical Institute, London.

JULY 25.

Publication of Examination Results, prior to which information as to individual results will not be available.

Short Course for Teachers.

Among the Annual Short Courses for Teachers in Technical Colleges, arranged by the Board of Education, is one for a limited number of actual or intending teachers of Gas Engineering and Gas Supply and subsidiary subjects. The Course will be conducted by Mr. C. H. Creasey, O.B.E., assisted by Dr. P. C. L. Thorne, H.M.I., at the Westminister Technical Institute, Vincent Square, S.W. 1, from Monday, July 2, to Friday, July 6, inclusive. No fee will be charged to teachers from schools in England and Wales for admittance to the Course, and certain travelling expenses will be allowed by the Board.

Through the kindness of the Warden and Committee, accommodation will be provided at the Imperial College Hostel, South Kensington, at an inclusive charge of 5s. 6d. per day for bed and breakfast. Other meals will be charged separately according to tariff.

The Course will include:

(*a*) Lectures and discussions on methods of teaching.
(*b*) Blackboard drawing.
(*c*) Practical work in Gas Supply.
(*d*) Special lectures on subjects of interest to students of Gas Engineering and Gas Supply.
(*e*) Visit to works, &c., in or near London.

Applications for admittance to the Course should be submitted to the Board of Education on Form 106U (T.i.) as soon as possible, and in any case not later than March 31. Forms of application, together with a pamphlet containing further particulars of the Course, can be obtained from the Secretary of the Institution of Gas Engineers, 28, Grosvenor Gardens, S.W. 1.

THE NEWS—continued.

Sir Arthur Duckham Memorial Fund.

First List of Donors.

Below is the first list of responses to the appeal on behalf of the Sir Arthur Duckham Memorial Fund—see last week's "Journal," p. 361. The list has been forwarded by Mr. J. R. W. Alexander, 28, Grosvenor Gardens, London, S.W., the Hon. Secretary and Treasurer to the Fund, and is made up to yesterday (Tuesday) morning.

ABBOTT, BIRKS, & CO., London.
"ADMIRER."
J. R. W. ALEXANDER, Westminster.
DAVID H. ALLEN, London.
Dr. G. W. ANDERSON, London.
ANDERSON BROS., Westminster.
JOHN ARGYLE, Bristol.
DUNCAN BAILEY, Wakefield.
Mrs. M. A. CLOUDESLEY BRERETON, Westminster.
F. G. L. BERTRAM, C.B.E., Berkhamstead.
BLANDFORD GAS COMPANY.
A. E. BROADBERRY, Hampstead.
R. W. BROADHEAD, Chipstead.
W. J. BROOKE, Scunthorpe.
Right Hon. WINSTON S. CHURCHILL, M.P., Westerham.
Dr. H. G. COLMAN, Westminster.
R. GIRDLESTONE COOPER, Westminster.
H. DE BOISSIERE, London.
W. NEWTON DREW, Thorncliffe.
JANE AND ALICE DUCKHAM, Freshwater.
G. F. DUNN, Wells.
WALTER T. DUNN, Hastings.
FALMOUTH GAS COMPANY.
PERCIVAL FLAVEL, J.P., Leamington.
ALEXANDER A. GARRETT, M.B.E., London.
GENERAL ELECTRIC COMPANY, LTD., London.
THOMAS GLOVER, C.B.E., Norwich.
F. GREENHALGH, Oldham.
ALFRED HARRISON, London.
HORSTMANN GEAR COMPANY, LTD., Bath.
D. M. HUGHES, Caerphilly.
INSTITUTION OF GAS ENGINEERS, Westminster.
ALFRED HENRY KEABLE, Westminster.
WALTER KING, LTD., London.
LESLIE C. LAMBERT, Glasgow.
Sir WILLIAM JAMES LARKE, K.B.E., Sidcup.
Sir WALTER T. LAYTON, C.H., Putney.
W. B. LEACH, London.
REGINALD GEORGE LONGCROFT, London.
Sir PAUL A. MAKINS, London.
McDOUGALLS, LTD., London.
ROBERT McDOUGALL, Stockport.
Dr. A. C. MONKHOUSE, Bristol.
THE N.O.D. INSTITUTE, London.
G. A. PEPPERCORN, Knowle.
HUBERT POOLEY, Leicester.
Dr. LAURENCE POTTS, Leatherhead.
Sir KEITH PRICE, London.
W. H. PRICE, Cromer.
Sir JOHN C. W. REITH, LL.D., London.
T. ROBERTS, Bolton.
SALAMON & CO., LTD., Rainham.
Messrs. SANDBERG, Westminster.
STEEL BAND CONVEYOR AND ENGINEERING COMPANY, LTD., Birmingham.
Colonel ALAN STEIN, Polmont.
J. WILKINSON, O.B.E., Nottingham.
WILLIAM CASH, F.C.A., London.
R. V. E. DE B. CRAWSHAY, Maldon.
JOHN K. FRAZER, Glasgow.
GEORGE KENT, LTD., London.
PHŒNIX SUPPLY COMPANY, London.
T. N. RITSON, Worthing.
SOCIETY OF BRITISH GAS INDUSTRIES, Westminster.
J. G. WEIR, Glasgow.
WOODALL-DUCKHAM COMPANIES, Westminster.

Up to and including Tuesday, Feb. 20, 65 donors had contributed a total sum of £1,654 11s. 6d. to the Fund.

Progress at Leicester.

Value of Showrooms.

At a recent meeting of the Leicester Gas Committee, Mr. J. Mitchell, the Engineer and Manager, reported that within the last month gas had been supplied to 640 new houses, mostly in the new districts, and in more than half of these gas fires and water heating appliances had been installed. This is regarded as an excellent record for one month.

The report also dealt with the value of the four show-

THE NEWS—continued.

rooms, the Market Street one having sold 400 cookers, 600 gas fires, and 700 water heating appliances during the quarter.

The new Belgrave Road showroom did such excellent business during its first quarter that it sold appliances to the amount of £60 a week.

Better Publicity Urged.

Responding to the toast of "The Institution of Mechanical Engineers," the President, Mr. Alan E. L. Chorlton, C.B.E., M.P., at the annual dinner of the South Wales Branch, paid tribute to what Mr. W. H. Johns, the Chairman of the Branch, had done for the Gas Industry in Swansea, and said that gas engineering lacked that sense of publicity which was essential for any progressive industry. Without publicity they were not going to progress at all.

He suggested to gas engineers that they should get rid of the inferiority complex, join together, and provide the sinews of war for a far better publicity than they had at present.

An Unfair Proposition.

"The relief of rates from profits is, as a general principle, deprecated by the Gas Industry for many reasons, the main one being that gas consumers are the people who provide the money which produces the profits, and are, therefore, paying in excess for what they receive."

This statement was made by the Burnley Gas Engineer (Mr. J. Herbert Clegg), in an address on "The Gas Industry as a Public Service" to members of the Nelson Rotary Club. Mr. Clegg said it appeared that the object should be to reduce the price of gas. This would be helpful in enabling the Gas Industry to compete with its rivals—coal, oil, and electricity. The absorption of profits for the relief of rates enabled non-gas consumers to obtain money from the gas consumers to relieve them of a portion of the just dues and demands which were made upon them by the Corporation for services rendered.

Mr. Clegg said that it must be borne in mind that the Gas Industry had already contributed its quota of taxes as in the case of any other industry. The Burnley Gas Department paid rates amounting to £9,000 a year.

Illuminating Engineers Celebrate.

The Twenty-Fifth Anniversary Dinner of the Illuminating Engineering Society, which took place on Tuesday of last week in the Empire Rooms of the Trocadero Restaurant, must have been as gratifying to the President (Mr. C. W. Sully), the Hon. Secretary (Mr. J. S. Dow), and all those concerned in its organization, as it undoubtedly was to the large assembly. The toast list was not long, so that plenty of time was left for dancing afterwards.

A telegram was received from Mr. F. P. Tarratt regretting his inability to be present, and there was a letter from the President of the Illuminating Engineering Society of America sending cordial greetings and warm congratulations on the twenty-fifth anniversary of the founding of the Society. The toast of "The Society" was submitted, in a humorous speech, by Mr. Henry W. Archer, Editor of the *Manchester Evening News*, who remarked that nothing has marked the quickening pace of human progress more clearly than the changes effected by the development of artificial lighting since the birth of the Society.

Responding to the toast, the President said the work and objects of the Society differed from those of many kindred organizations, in that to-day the Illuminating Engineering Society were striving to develop one of the most essential requirements of mankind. The Society was inaugurated at a period when there were two conflicting industries developing at the same time the use of artificial light. The Society had enabled both these industries to obtain the enormous advantage of learning through contact with each other; for in the study of illumination whatever was of assistance to the one must also benefit the other. The most important point, however, in connection with the activities of the Society was that they affected the customs and habits of the whole nation.

A special effort is now being made in many directions to extend the membership of the Society, and it has been arranged to introduce a new class of Affiliated Students.

Two-Part Tariff at Rotherham.

Success of the System.

The Rotherham Council has confirmed the Gas Committee's recommendation to make the two-part tariff system of charging for gas available to all domestic consumers. The householder pays a fixed service charge of 10d. or more per week according to the size of the house and then has all the gas he requires at 10d. per 1,000 c.ft.

The two-part tariff has been under experimental application for 18 months and has resulted in greatly increased consumptions of gas with a considerable increase in profit to the Department. It has always been considered difficult to apply a multiple tariff system of charging to prepayment consumers, but Rotherham has solved the problem in a simple manner, satisfactory to the consumer and without great expense. The consumer pays his service charge weekly and then gets 1,000 c.ft. of gas for every shilling he puts in his slot meter.

Gas in Rotherham is to be sold on terms which make it possible for every householder to use gas for water heating and heating, as well as for cooking.

Mr. J. T. Haynes, Engineer and Manager to the Rotherham Gas Department, has forwarded us the following significant particulars of the experimental two-part tariff.

TWO-PART TARIFF EXPERIMENT.

TABLE I.—*12 Months' Test—Totals.*

Type of House.	No. Under Test.		Jan.-Dec., 1932.		Jan.-Dec., 1933.	
	Slot.	Ordinary	Gas Used	Revenue.	Gas Used.	Revenue.
			C.Ft.	£ s. d.	C.Ft.	£ s. d.
Non-parlour .	8	..	93,200	15 10 5	749,500	52 13 8
Parlour. . .	15	3	315,400	52 3 4	1,014,100	88 1 2
Up to 4 rooms.	10	2	156,320	26 5 5	392,850	40 9 5
5 and 6 rooms.	42	34	1,169,135	206 19 9	3,154,800	291 3 5
7 and 8 rooms.	4	9	253,200	41 13 6	914,400	72 4 11
9 and 10 rooms	..	1	14,900	2 6 9	27,400	3 1 10
Over 10 rooms	1	5	87,500	13 19 3	507,900	36 6 1
	80	54				
Total. . .	134		2,089,655	£358 18 5	6,760,950	£584 0 6
Average . .			15,600	£2 13 7	50,500	£4 7 2

Extra gas purchased	= 4,671,395
At 6d. per 1000 c.ft.	= £116 15 9
This year's revenue.	= £584 0 6
Last year's revenue.	= £358 18 5
	£225 2 1
Extra gas cost	= £116 15 9
Increased net revenue	= £108 6 4

Jan., 1934.

TABLE II.—*Showing Movement of Consumptions.*

Annual Consumption.	Flat-Rate System Consumers.	Two-Part Tariff System Consumers.
Under 10,000 . .	19	..
10,000- 17,000 .	31	5
17,000- 25,000 .	19	17
25,000- 50,000 .	51	39
50,000- 75,000 .	9	31
75,000-100,000 .	2	12
100,000-150,000 .	2	13
150,000-200,000 .	1	11
200,000-300,000 .	..	3
Over 300,000 . .	..	3
	134	134
Average . .	15,600 c.ft.	50,500 c.ft.

Average consumption per domestic consumer, 17,000 c.ft. per annum.

New Gas-Making Plant for Stalybridge.

A deputation of the Stalybridge Council, on behalf of the Gas Department, were informed by the Ministry of Health in December last that no benefit could be obtained by Stalybridge purchasing a supply of gas from an outside source. The Council have since been informed that after full consideration the Ministry were satisfied that they would also derive no benefit at the present time from the formation of a Joint Board. Both ideas have therefore been abandoned.

The Ministry of Health have now sanctioned the Stalybridge Corporation to borrow £18,000 for carbonizing plant renewals. The decision is the outcome of an offer by

Mossley Corporation to supply gas to Stalybridge early in 1933 at a figure of 16d. per 1,000 c.ft.—a figure later reduced to 12d. per 1,000 c.ft. at the Borough boundary. At the Ministry of Health inquiry held in September last this point was raised, and from the inquiry the Ministry were satisfied with the Stalybridge Gas Department's scheme.

It is proposed to provide a modern carbonizing plant of intermittent vertical chambers. There is in Stalybridge a definite market for a high-class hard coke, now used for industrial purposes, similar, mechanically, to foundry and oven coke. The proposed chamber ovens will carbonize a maximum of 50 tons of coal each 24 hours. Coal plant and storage are included, together with a small coal mixing plant of very simple design. Coke dry cooling chambers are being installed under the vertical chamber outlets, and a small coke grading plant for quick service will be erected.

The contract has been let to Gas Chambers and Coke Ovens, Ltd., Artillery House, Westminster, S.W. 1.

Another Offer of Gas for Glasgow.

An inquiry regarding a supply of gas has been made to the Glasgow Gas Department by Messrs. William Dixon & Co., ironmasters. Messrs. Dixon have decided to erect modern coke ovens at their Glasgow Works and they expect to have a supply of gas available for Corporation purposes of between 4,000,000 and 5,000,000 c.ft. per day. No definite statement of the probable cost of the gas has been made, as the offer is only of a preliminary nature. The offer has been before the Gas Sub-Committee for Distribution and Works, who have passed it for further consideration to the parent Committee.

A Special Sub-Committee are considering the offer made by Messrs. William Baird & Co., Gartsherrie, and this Committee have decided to send a deputation to Sheffield to inspect the plant and methods of working there before considering the Baird offer further.

Developments at Taunton.

New Apparatus Manufacturing Department.

The Taunton Gas Light and Coke Company, Somerset, have recently extended their activities by establishing a new business for the manufacture of gas apparatus, water heaters, wash coppers, fire screens, and radiators, and for the making of many other articles of sheet metal and art metal work.

They have appointed a Birmingham man, Mr. F. L. Genge, as Manager, and he has already taken up his duties at Taunton with six skilled workmen from the Midlands; and at present they are busy making articles to be used by the Company.

The Company are making extensions to their premises to accommodate new plant and machinery which is being laid down, and it is hoped that if the new departure proves successful it will in time furnish employment for as many as 200 hands.

The venture is looked upon with much interest by the people of Taunton, as it will mean an important addition to local industries.

Commercial Grades of British Coal.

The uniformly high quality of typical examples of the commercial output of British collieries is well brought out in a Fuel Research Survey Paper issued by the Department of Scientific and Industrial Research (Fuel Research Survey Paper No. 31. Yorkshire, Nottinghamshire, and Derbyshire Coalfield. Analysis of Commercial Grades of Coal—Part II. Published by H.M. Stationery Office. Price 9d. net). This report marks the completion of a systematic examination of the commercial grades of coal produced and marketed in the South Yorkshire, Nottinghamshire, and Derbyshire coalfield. The present report deals with the output of 17 collieries producing 130 grades of coal, which range from those yielding good metallurgical coke to non-coking coals.

The sampling was carried out at the pit-head—at the conveyor belts or at chutes delivering the coal to wagons or store. The work done on these samples and the presentation of the results follow exactly the lines of a previous report (Survey Paper No. 20) dealing with 39 collieries in the same area. Each colliery is dealt with separately, and the grades of coal samples from it are listed and the sizes given. For each grade is given a proximate analysis, sulphur, nitrogen, and chloride content, and the calorific value. In addition the percentage of phosphorus is given in grades that are suitable for coke manufacture, and in certain cases the results of ultimate analyses and of laboratory carbonization assays at 600° C.

THE NEWS—continued.

Extensions of Plant at Wallasey Gas-Works.

Sanction has been received from the Minister of Health by the County Borough of Wallasey for the necessary expenditure in connection with a scheme of modernization and extension of plant at the gas-works, and a contract has been made with the Woodall-Duckham Company for the necessary new vertical retort installation and other plant.

This scheme provides for 28 retorts with a special design of external breeze-burning producer battery, arranged centrally with flues and connections for one waste-heat tubular boiler and one producer gas fired tubular boiler. Coke screening plant in duplicate and coke handling plant are also to be provided, arranged above new coke hoppers of reinforced concrete.

The whole scheme is specially designed as duplicate, wherever possible, of the 1932 installation of Woodall-Duckham vertical retorts and coke installation, and the plant is arranged as an extension and modernization of an existing installation of 24 vertical retorts, of which much plant and structure is to be re-used in the new contract.

Institution of Mechanical Engineers.

Annual Report of the Council.

In the course of their report on the progress and work of the Institution of Mechanical Engineers during the year 1933, the Council state that 83 candidates passed the Studentship examination, and 367 the Associate Membership examination or sections thereof.

Improvements have been effected to the Meeting Hall, which has been panelled in natural oak and an entirely new system of lighting installed. The heating and ventilating arrangements have also been improved, while an additional annexe to the Library has been built.

The report goes on to state that unemployment in the engineering industry has given the Council great concern, and a Committee was established to consider proposals for works of national importance which could be submitted to the Government for consideration. In June a letter was addressed by the President to the Prime Minister, expressing the desire of the Council to co-operate with the Government and to give any assistance in their power in connection with any proposals which might lead to the preservation of the efficiency of the technically trained engineer, and the utilization of his services for the benefit of the nation and the alleviation of unemployment generally. Various committees and sub-committees were set up to inquire into the matter, and after several suggestions had been explored, it was thought that the following were worthy of consideration: Co-ordination and provision of water supplies throughout the country and co-ordination and extension of gas supplies throughout the country. A report upon these two subjects has been submitted to the Council.

Cambridge Company's Centenary.

A Year of Steady Progress.

Reference was made to the Undertaking's Centenary at the Annual Meeting of the Cambridge University and Town Gas-Light Company.

The Vice-Chancellor (Mr. J. F. Cameron), who was re-elected Chairman of the Board of Directors, speaking of the anniversary, said on its foundation the Company was a very small business and was purely a gas light company; it was thought a wonderful thing to get any lighting of that sort then.

"There have been great improvements in methods and manufacture," he continued, "in purification, while the standard by which gas is measured is different, and instead of working to candle-power we work to calorific value. I do not suppose the people who started 100 years ago in a very small way could foresee what the Company would develop into, and we cannot foresee what the Company will be like in another 100 years' time. However, the finances show the business is going on very satisfactorily."

Moving the adoption of the report, the Chairman said: "The account I have now to give is of a steady but rather uneventful year's working, with such changes as are from time to time required to keep the business up-to-date and efficient, but without any event of major importance.

"The only thing really new is the production of benzole, which was begun about the beginning of May, and the accounts show an income from the sale of benzole of £1,960. Against this there must be put the cost of working and, what is more important, the cost of the extra coal that is required to maintain the calorific value of the gas, but there remains a profit, and we are satisfied that the introduction of this new plant is in the interests of the Company."

THE NEWS – *continued.*

South-Western Gas Corporation, Ltd.

A New Company Registration.

The South-Western Gas Corporation, Ltd., has been registered as a public company with a capital of £600,000 in £1 shares, consisting of 200,000 4½% redeemable cumulative preference and 400,000 ordinary, to acquire interests in gas undertakings and manage and develop such concerns.

The Corporation is also authorized to carry on the business of manufacturing or supplying gas, electricity, and water, and to manufacture, purchase, sell, and supply gas for all purposes in any part of the world. Further, it is entitled to deal in, purchase, and manufacture coke, coal tar, pitch, ammoniacal liquor, and other residual products obtained in the manufacture of gas; and to distil oils, &c.

The qualifications of the Directors are the holding alone of 500 shares of any class, and the Directors' remuneration is £200 per annum and the Chairman £350. At the moment there are three Directors—namely, Mr. S. J. Ingram, Managing Director of the Truro Gas Company, Mr. C. Holmes Hunt, Chairman of the Bude Gas Company, and Mr. C. Lewis Rosewarne, a Director of the Camborne Gas Company, Ltd.

Messrs. Deloitte, Plender, Griffiths, & Co. have been appointed Auditors of the South-Western Gas Corporation, while the Solicitors are Herbert Smith & Co., of 62, London Wall, E.C. 2.

Klönne Gasholder at Port Talbot.

The British (Guest Keen Baldwins) Iron and Steel Company was formed through the fusion of the steel making interests of Messrs. Guest, Keen, & Nettlefolds and Messrs. Baldwins, Ltd., and represents one of the largest rationalization schemes carried out in the steel industry.

Since the formation of the Company, the heavy steel interests have been centred at Port Talbot, and many developments and improvements have taken place at both the Company's Works situated there. Not the least interesting is the erection of a large Klönne waterless gasholder, which is to be used for storing gas from the blast furnaces at the Margam Works, some 1½ miles away, for use in the boilers and furnaces at the Port Talbot Works. The contract for the supply and erection of this is being carried out by Horseley Bridge & Thomas Piggott, Ltd., of Tipton, Staffs.

The diameter of the gasholder is 126 ft. and the height 185 ft. 3 in., the effective storage capacity being 2,000,000 c.ft.

The shell is constructed of $\frac{5}{16}$-in. sheets, and round the periphery there are fixed 24 rolled-steel joists equally spaced and extending the full height of the holder. Five balconies are provided which serve as inspection galleries, and at the same time maintain the true circularity of the shell. The circumferential angles are firmly connected to the vertical columns and serve the dual purpose of stiffeners and butt straps. By this method of construction the correct circumference of the holder is obtained. The bottom of the holder is formed of ½-in. sheets, with the exception of an outer ring which is $\frac{7}{16}$ in. thick.

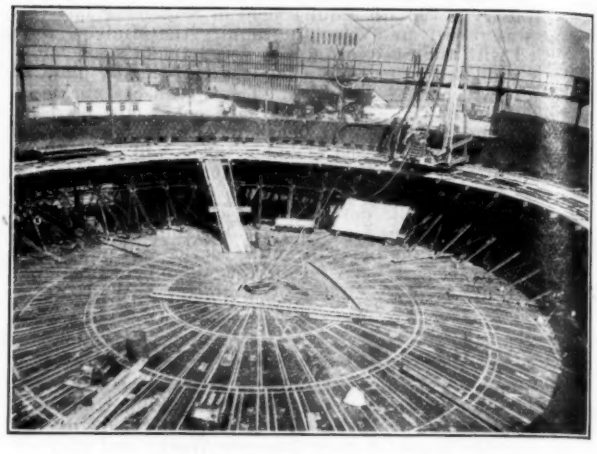
The piston consists of a self-supporting cover, having round its outer edge a cup filled with oil. A flexible sheet steel ring, to which the packing is attached, is suspended from the external framework of the piston and dips into the oil cup. The packing ring is made of six layers of a special cotton fabric vulcanized with a gas resisting compound. This entire packing ring is pressed against the interior of the holder by means of levers and weights. The pressure thrown on to the packing ring by virtue of the levers takes up any wear and effectively compensates for slight variations in the diameter of the holder.

The piston is guided as it travels up and down by two sets of rollers, both of which are located above the piston and thus can be easily inspected, lubricated, and adjusted while the holder is in service. The rollers are constructed of laminated hard wood discs; thus there is no metal-to-metal contact between the piston and shell, the distance between the upper and lower sets being ample to prevent tilting of the piston.

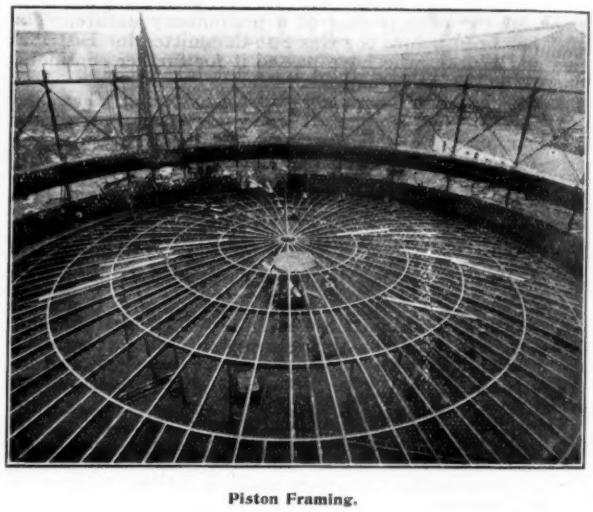
The lubricant used is chemically inert and physically static over a wide temperature range, and requires no heating or pumping.

The top of the holder is covered by a roof designed as a self-supporting arch, and at its centre is fixed a dome which is large enough to permit access to the interior of the holder. Access to the piston is effected by means of a staircase on the outside and a passenger lift and chain ladder on the inside, the latter being adaptable to the varying positions of the piston.

The interior of the holder is lighted by means of windows fixed on the roof, and is also efficiently ventilated by means of louvres located around the shell near the top and also through the centre dome on the roof.



Piston Riveted and Erecting Shell.



Piston Framing.

To indicate the contents of the holder at any time a dial indicator is fitted in a suitable position, the diameter of the face of this indicator being 6 ft. 6 in. Electrical indicators of the Evershed & Vignole's type are also being fitted externally to record the capacity and pressure at Margam and various points where the gas will be used.

Neutral Furnace Atmospheres.

An important article on the production of neutral furnace atmospheres by the pyrogenic decomposition of town gas was published recently in *Fuel in Science and Practice* (Vol. XIII., No. 2). The author is Dr. F. Heathcoat, a member of the staff of the Rotherham College of Technology and Art, and who, by arrangement with the Rotherham Education Committee, acts as a member of the staff of Mr. J. T. Haynes, Engineer and Manager to the Rotherham Gas Department.

In the article a method of preparing neutral furnace atmospheres suitable for the heat-treatment of steels of any carbon content in muffle furnaces is described. The method consists in passing town gas or coke oven gas through preheating tubes prior to their passage through the muffle furnace. A process of regulated carbon deposition occurs in these preheating tubes due to the pyrolysis of the hydrocarbons present in the original gas. The composition of the gas is altered by varying the rate of flow to give a neutral atmosphere for a steel of any carbon content. It is pointed out that the methane/hydrogen ratio of the gas must be decreased with decreasing carbon content of the steel being treated in accordance with physico-chemical principles. This method has been successfully used with a continuous strip normalizing furnace.

Reprints of the article may be obtained from *Fuel in Science and Practice*, 30, Bouverie Street, London, E.C. 4.

Newport Gas-Works Benefit Society.

Annual Dinner.

For 55 years the Newport Gas-Works Benefit Society has been in existence and provided benefits when sickness and death overcame members or their families. In 1879, when the Society was formed, contributions amounted to £45. Last year they totalled £159, and there is a reserve fund of £650. The amount distributed in benefits since the formation of the Society is £6,614, and members have contributed £2,219 to the Royal Gwent Hospital.

These facts show how the Society has progressed, and so the members at their annual dinner at the King's Head Hotel, Newport, had every reason to be proud. Mr. J. H. Canning, O.B.E., J.P., who is Hon. Treasurer of the Society, presided, and was supported by a large number of prominent townsmen.

The Newport and Cardiff Gas Companies were almost twin sisters and their interests were identical, said Mr. H. D. Madden, who submitted the toast of the Chairman and Directors of Newport Gas Company. The Newport Company was the largest contributor to the Industrial Development Centre for Wales, which Centre was at the Laboratories of the Cardiff Gas Light and Coke Company.

The response was by Alderman C. F. Williams, J.P., a Director of the Company.

The Society's work was reviewed, and the figures given were quoted by Mr. W. Stanford, Secretary of Newport Gas Company, in toasting "The Benefit Society." During the past year, he said, 56 members had received benefit. The Society was a co-operative movement to help fellow workers in times of distress. The accounts showed a prosperous state of affairs, and reflected credit on those managing the Society.

Mr. H. Irvine, Chairman of the Benefit Society, who responded, said the annual dinner was a gathering of the clans. He thanked donors to the fund, the clerks of the Company who had assisted the Committee, and the Secretary (Mr. A. H. Trigg), who had done much spade-work. The fund was financially sound.

Thanks to the Chairman were proposed by Mr. H. Haley, who said that possibly townspeople did not realize the high affection and esteem in which Mr. Canning was held by the Company's employees. Mr. Haley congratulated Mr. Canning on his appointment as a Justice of the Peace.

His health was drunk with musical honours, and the Chairman returned thanks.

New Dry Purification Process

A. Thau, in *Das Gas- und Wasserfach*, 1934, 77, 33-35 (Jan. 20), describes a new intensive method of dry purification invented by Raffloer and working on a semi-large scale at the Concordia Colliery, Oberhausen.

The process combines the advantages inherent in dry purification with a small ground-space requirement and permits of recovery of elementary sulphur in a very simple manner.

In place of a non-uniform, fine-grained material, a compacted oxide is employed in the form of balls 0·6-0·8 in. in diameter made by a special process. Due to their form, the balls pack uniformly in the purifier, distribute the gas uniformly over the cross-section of the purifier, and create but a slight back-pressure. The balls are manufactured from oxide prepared in the ordinary way. They have peculiar properties in that, in addition to being very strong, they have the high internal porosity of 60%, and this facilitates their permeability to gas.

The oxide in ball form is used in towers, two of which constitute a purification plant. The oxide is charged at the top and withdrawn, by gravity, from below. Tar-free gas is passed upwards through one of the towers and, free from sulphuretted hydrogen, leaves it at the top. When the contents of this tower are fouled, the gas is diverted to the second tower, air being passed in an upward direction through the first tower to revivify the oxide. Appropriate connections enable the change-over to be effected with a single manipulation. Fouling and revivification thus occur separately and no air is added to the gas.

Whereas the normal gas velocity in box purifiers is 0·2-0·28 in. per second, the velocity in these towers may be as high as 4 in. per second or even higher. Hence a smaller volume is required in the purifier. A further feature operating in the same sense is the fact that the weight of effective oxide contained in a box purifier is only 21 lbs. per c.ft. of capacity, whereas it reaches a figure of 44 lbs. per c.ft. in the case of the oxide in ball form. The back pressure caused by the towers filled with oxide balls is equivalent to approximately 3 in. W.G. Absolutely complete removal of sulphuretted hydrogen is claimed even when a gas containing as much as 1300-2200 grains of H_2S per 100 c.ft. is treated.

The experimental plant at Oberhausen consists only of one tower with an internal diameter of 2 ft. 3½ in. and a height of 16 ft. 5 in. and suffices for the purification of 140,000 c.ft. of gas per 24 hours.

For the purification of 3·5 million c.ft. per 24 hours, two towers of internal diameter 12 ft. 7½ in. and height 19 ft. 8 in. would be required. The ground-space occupied would be only 30 sq. yards compared with 240 sq. yards in the case of box purifiers. The material in the bottom zone picks up sulphur to an approximate concentration of 45%. At the end of the revivification period, a portion of the bottom material is discharged from below and replaced with fresh material from above. The gas thus comes in contact with fresh material before leaving the tower, and the direction of travel of the gas is counter-current to the direction of the oxide.

The towers are designed on the basis of the contents of the bottom zone being discharged every three days or thereabouts.

The oxide discharged from the tower and saturated with sulphur, is extracted with carbon disulphide for recovery of the sulphur, and retains its spherical form during this operation. Due to the special form of the oxide, losses of solvent are minimized.

In view of the fact that cylindrical purifiers are employed, the purifiers may be designed for use under pressure; hence, the process may be applied for the purification of gas delivered under pressure to a grid.

The following calculation enables an opinion as to the economics of the process to be formed. With 3·5 million c.ft. of gas per 24 hours, and a content of 380 grains of H_2S per 100 c.ft., 0·8 ton of sulphur would be recovered per day. On the assumption that the spent oxide would contain 45% of sulphur, about 1 ton of oxide in ball form would be discharged from the towers per day. The price of the ball oxide is at present about 65s. per ton on the dry basis, that of sulphur 80s. per ton [German prices converted at the par of exchange]. Of the extracted oxide, about 33⅓%—*i.e.*, one-third of a ton—would be discarded and replaced with an equivalent amount of fresh oxide; hence the towers would be charged as to 66⅔% with recovered material and as to 33⅓% with fresh material. The labour required for a two-tower installation is one man for each of two of the three shifts of a day. His work will mainly be concerned with sulphur recovery, since the purifier requires only an occasional visit for inspection and changing over. The purity and colour of the recovered sulphur depend on the extent to which the gas has been freed from tar.

The following balance-sheet is given:

Costs for the Treatment of 3·5 Million C.Ft. of Gas per 24 Hours.
H_2S Content 380 Grains per 100 C.Ft.

[Marks converted at par of exchange].

		s.	d.
Cost of purification and sulphur recovery plant	£3,500		
Operating costs—			
Oxide, ¼ ton at 65s.		21	8
Power		1	0
Labour, 2 manshifts at 7s.		14	0
Extraction costs		15	0
Capital charges at 15%		28	9
Daily expenses		80	5
Revenue—			
0·8 ton sulphur, less 2% loss, at 80s. per ton		62	5
Net cost for purification of 3·5 million c.ft.		18	0
Equivalent to 0·062d. per 1000 c.ft.			

National Gas Council

Meeting of Central Executive Board

A Meeting of the Central Executive Board of the National Gas Council was held at 28, Grosvenor Gardens, London, S.W. 1, on Tuesday, Feb. 13. The chair was taken by Mr. William Cash, F.C.A., J.P. (Vice-Chairman).

Among the matters considered were the following:

Rating and Valuation.—It was reported that a meeting of the Rating and Valuation Committee of the Conjoint Conference of Public Utility Associations had been held on Jan. 23, with regard to various matters arising out of the second quinquennial valuation. The subject was fully discussed and it was generally felt that it was now time to reconsider the whole question of the machinery of valuation.

It was arranged to report the views of the Board on this matter to the Rating Committee of the Conjoint Conference at an early date.

Gas Charges—Experimental Application of the Two-Part Tariff for Domestic Consumers.—It was stated that a further report had been received in regard to this experiment, covering the twelve months ended Dec. 31, 1933, and it was agreed that it should now be circulated to all members of the Board.

Concentrated Ammonia and Ammonium Bicarbonate.—A communication from the British Sulphate of Ammonia Federation was reported, inviting consideration of new projects with regard to the manufacture of concentrated ammonia and ammonium bicarbonate. It was agreed that in all the circumstances the best course would be to advise the British Sulphate of Ammonia Federation to ask representatives of the Institution of Gas Engineers to meet their Executive Committee. It was indicated that representatives of the Liquor Effluents and Ammonia Sub-Committee of the Institution of Gas Engineers would be pleased to confer with the Federation on the subject.

Conjoint Conference of Public Utility Associations.

(*a*) *Second Annual Meeting on Jan.* 31.—It was stated that copies of the Annual Report of the Conjoint Conference had been circulated among members of the Board, giving a brief outline of the work of the Conference, from which it would be seen that very considerable success had been achieved with regard to the different questions dealt with.

(*b*) *Appointment of President.*—It was stated that the Conference felt itself fortunate in once again securing the services of Lord Mount Temple as President for the ensuing year.

(*c*) *Appointment of Vice-Presidents.*—It was also reported that the Vice-Presidents elected were:

Lord Falmouth, on behalf of the Electricity Supply Associations;

Sir David Milne-Watson, on behalf of the Gas Interests; and

Mr. Wm. Cash, representing the Water Interests.

(*d*) *Meeting of the Council of the Conjoint Conference, held subsequent to the Annual Meeting.*—It was reported that, in accordance with the decision at the previous meeting of the Central Executive Board, Mr. W. B. Woodhouse had been proposed by the Council as Chairman, and his appointment had been unanimously approved. It had been left to the Gas and Water Interests to put forward their nominees as Vice-Chairmen at the next meeting of the Council.

Mains and Cables in Highways.—It was reported that a meeting of the Joint Negotiating Committee consisting of representatives of the Highway Authorities on the one hand and of Gas and Electricity Associations on the other hand had met on Feb. 7, when agreement had been reached with regard to the Draft Clause. A memorandum was being prepared to accompany such Clause, and when this was ready it would be submitted to the Associations concerned.

Advisory Council of Seience Museum, South Kensington —Presentation by the Gas Light and Coke Company of a Model of a Complete Gas-Works.—It was reported that this model had been accepted by the Museum Authorities and had been on exhibition since Feb. 3. It was suggested that the model might usefully be supplemented by a series of working models illustrating gas-works plant, and it was decided to investigate further the possibility of giving effect to this suggestion.

Finance Committee.—It was reported that Mr. R. Bruce Anderson had intimated his desire to be relieved as a member of the Finance Committee, a position which he had held for 15 years. The Board received this letter with much regret, and it was agreed to express to Mr. Bruce Anderson the thanks and appreciation of his colleagues for the time and consideration which he had devoted to this work for so many years.

Water Gas*

It has for some time been known that a comprehensive treatise on gas manufacture was in course of preparation and that the editor and authors were members of the staff of the largest Gas Company in the world.

The publication of the work has been eagerly awaited in view of the unique information which must obviously be available to such authors. The first volume of the three which will form the treatise has now appeared. The choice of water gas as the subject of this volume was a deliberate one, the reason being that there is particularly urgent demand for a text-book upon this branch of gas technology. The decision was also made to include a section on temperature measurement in this volume since it is a subject of vital interest alike in the manufacture of water gas and coal gas.

The ten chapters of the book are respectively headed Chemistry of the Water Gas Process, Practical Control of the Water Gas Generator, Oil Cracking: Laboratory Investigations, Oil Cracking: Plant Technique, Practical Methods of Testing Water Gas Plant, Water Gas Plant Balances, The Complete Gasification of Coal, Special Modifications of Water Gas Plant, Summary and Conclusions, Temperature Measurement. Their subject-matter will readily be gathered from their titles.

In a general introduction by the Editor, stress is laid on the fact that the striking feature of the water gas plant is the ease with which it may be brought into operation as an alternative in case of emergency. From the information contained in tables in the introduction it may be gathered that out of 40,803 million c.ft. of water gas made by authorized undertakings in 1931, 13,514 million c.ft., or one-third of the total, represented the volume made by the Gas Light and Coke Company. The weight of coke employed per 1,000 c.ft. of water gas shows a progressive decrease from 55·9 lbs., for the authorized undertakings of Great Britain, in 1921, to 44·0 lbs. in 1931. Part of the saving is due to the greater conservation of waste heat. Much of it is due to the careful analysis of plant operating conditions.

Attention may be directed to a few of the conclusions drawn by the author. A thorough investigation of the influence of blast velocity on the efficiency of blue gas manufacture is needed as the available information is not satisfactory. The coke should have a low content of moisture and ash and should be free from dust. Pieces from 1—4 in. in size are best, and thorough screening should be carried out. For this purpose, the screens fitted with automatic feeding devices are often unsatisfactory, as the holes become blocked with pieces of coke. The rotary type is preferable and also causes little breakage. The melting-point of the ash should not be too high. A satisfactory melting-point is about 1,350° C. It is more important to select a coke that is unreactive to carbon dioxide than one which is highly reactive to steam. Relatively little difference can be observed in the behaviour of cokes from horizontal and vertical retorts. Large variations in fuel-bed depth should be avoided. One of the chief conditions to be observed is the proper duration of the blow and run and analysis of the gas, particularly at the end of these periods, provides invaluable information as to the proper working of the plant. The best oil for carburetting is one containing a maximum of paraffins and olefines. In general, the smaller the volume of primary air that is used per thousand cubic feet of water gas, the more efficient the process will be. The modern tendency towards entirely automatic operation has not fully fulfilled expectations of improved performance, since the increase in the number of changes made in

* "Water Gas," by R. H. Griffith, with a Section on Temperature Measurement by H. C. Exell. Edited by H. Hollings. Vol. I. of a Treatise on the Manufacture of Gas. [London, 1934, Ernest Benn, Ltd. Pp. xiv. + 260. Price 36s. net.]

the valves probably accounts for losses, as leakage generally occurs more or less severely at all such points. Also the valuable feature of personal observation of the fire is absent. It is likely that changes will take place in the direction of lengthening the cycle operated on automatic plants and of selecting more especially the coke used. Every particular type of ash present in the fuel will produce a different form and amount of clinker. For this reason, the automatic clinkering grate may become a dangerous luxury unless used with intelligence. The use of a centrifuge is generally the most satisfactory method of preparing the tar for disposal. The addition of 1% of phenol to a warm tar emulsion will generally cause very rapid separation and is a useful method of treatment for small samples for analysis.

The chapter devoted to methods of testing contains useful advice on suitable meters, and that dealing with temperature measurement includes much information of a very practical nature.

From the foregoing, it might appear that the book is all that could be desired. Actually, however, this is far from being the case. The order in which the subject is treated is at fault, since no explanation of the meaning of back-run, up-run, and down-run is given until near the end. In a well-planned book, when reference is made to matter on another page, it is almost invariably to an earlier page. In this book, the reverse is the case, and a reader without knowledge of the subject would constantly have to look ahead to find an explanation for something he has just read. References to work on the combustion of coke and on other matters are in many cases too much lacking in detail to render an appreciation of the particular investigation possible. Explanatory and critical comment is, for the most part, inadequate or absent, especially in the section dealing with operating results. This, indeed, is not surprising, for an attempt to provide a comprehensive treatise on water gas in a space of 188 pages must be doomed to failure. Data for heats of formation and free energy are given, but their significance and use are not explained.

Reference is made to a chart showing a marked increase in the hydrogen content of oil gas at a temperature of 825° C. The chart is, however, not given. The yield of tar at different temperatures with and without added oxygen is stated to be illustrated in fig. 39. No mention of oxygen is, however, made in the figure; hence the particular curve cannot be identified—if, indeed, it is there. An indication is given that in some cases the waste material from the generator should be sieved, preferably into five different sizes, but the sizes are not stated.

There are some tantalizing omissions. The statement is made that Haber carried out an extensive study of the subject of the cracking of hydrocarbons and contested the suggestions of Berthelot. The opposing views are, however, not given. It is also stated that in a series of papers by Wilson the whole subject of oil cracking is dealt with on a thermodynamic basis and that the results are of great interest. No further information is given apart from a reference to the Proceedings of the Royal Society, a journal unlikely to be available in a gas-works. A further omission is the neglect to supply titles to the numerous tables scattered throughout the volume.

London and Counties Coke Association

Second Annual General Meeting

In the absence of the President of the Association, Dr. Charles C. Carpenter, C.B.E., Mr. R. W. Foot, O.B.E., was asked to take the chair at the Second Annual General Meeting of the London and Counties Coke Association, at which there was a large attendance of members.

The Chairman, in moving the adoption of the report and accounts, reviewed the work of the Association during the past year. He said the Association had now 152 members in its area, which covered London and the surrounding eleven counties. These members produced last year for inland sale approximately 2,603,000 tons of coke, representing over 90% of the total coke produced within the area. This showed the responsibility the Association had in the coke industry. He said that while always bearing in mind that the Association must do everything possible to enable locally produced coke to be sold within its district, it was hoped that by continued co-operation between undertakings who produced more than sufficient coke to meet the demands of their area and those who did not, it would be possible to maintain even distribution, and promote the sale of associated coke.

The Chairman made particular reference to the technical work of the Association and said that this was one of its most important functions. This work divided itself into two parts—viz., technical work involving the improvement of coke produced in the area, and the technical assistance given to members, clients, merchants, or factors on specific problems connected with its use.

Technical Work.

In regard to the first point he said that the Technical Committee of the Association during the past year had devoted its energies to two main objects—viz., the improvement of coke burning appliances and grading facilities, both extremely important subjects. Also during the year there had been some extremely good technical work done by various members of the Association, work of the greatest importance to the coke business, such as the development of what might be termed the automatic heating boiler, self-feeding and thermostatically controlled—a unit operating on coke with the high efficiency, cleanliness, and convenience hitherto only associated with liquid or gaseous fuels.

In the field of coke burning domestic appliances, improvements had been effected in design both of the hot water boiler and the open coke fire, and makers of such appliances had been given the benefit of the Association's work in this direction. The open coke fire had particularly made an appeal to the public, its characteristics of cheerfulness and ease of lighting combined with economy in operation having made it universally popular. And it was of great importance in this connection that the general public were becoming more and more conscious of the value of smokeless fuel in eliminating the smoke nuisance. He added that coke was an extraordinarily good fuel provided it was properly produced and properly graded, and also provided customers were told how it should be used.

There was a time not very long ago, he said, when coke for central heating and factory purposes was beginning to take a back place. There had been hardly any installation designed within the last few years as an up-to-date coke installation; coke installations were the old-fashioned ones. The modern installations were the oil-burning ones, and oil was in danger of sweeping the board.

Two important things had happened during the last year. First of all there had been a tax of a penny a gallon on oil, which had made architects and ventilating engineers pause before recommending so readily oil for central heating. The second thing, perhaps of even more importance, was the improved technique, so far as coke burning was concerned. It was now possible, he said, to have for their central heating a coke installation better than anything that coke had ever done before. Coke in 1933 with an up-to-date modern boiler with thermostatic control, with proper handling arrangements for graded coke, with exactly the right size of coke for that size of boiler, and with everything clean and the boiler-house tiled was quite a different picture. It could not be compared in any way with the installation of, say, 1923. In 1923 a coke installation was dependent entirely upon a semi-skilled labourer shovelling coke without any check on how much went in, or how much ought to go in, or what the heats and temperatures were. Now in 1933 coke was an exact fuel, and could be applied with the heat thermostatically controlled, and the coke boiler looking after itself without any attention for twenty-four hours.

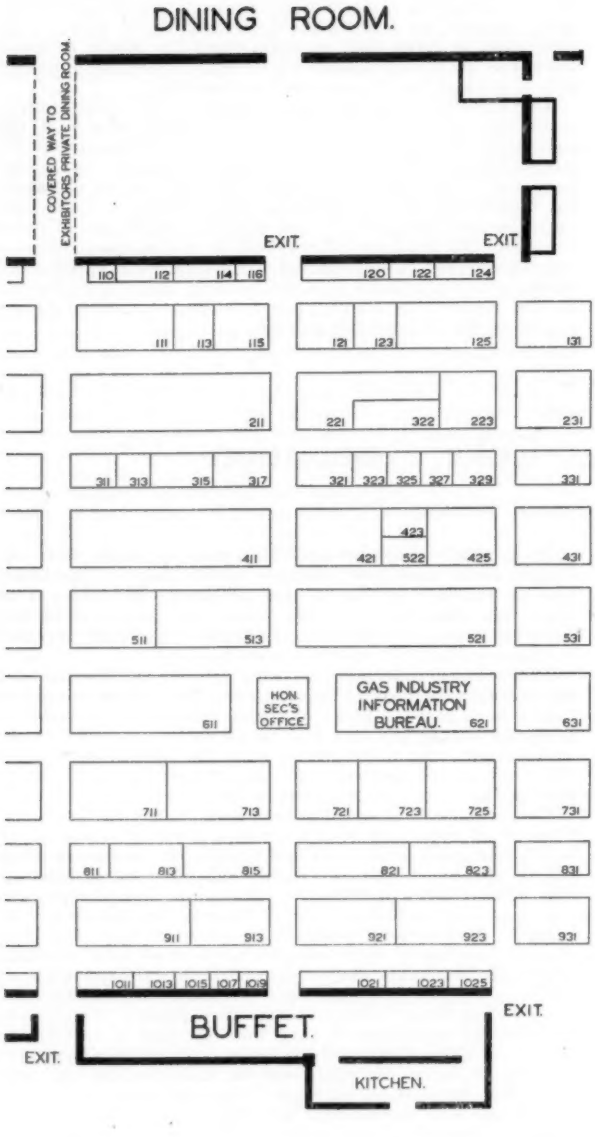
The next most important thing, he continued, was to make certain that the buyer who was still thinking of coke as it was, say, in 1923, knew what coke could do in 1933.

In reviewing staff organization, the Chairman said that Mr. W. L. Boon had been appointed Manager, and Miss C. A. Wooster Secretary, and that one of Mr. Boon's first duties would be to extend and reinforce the technical side of the Association.

Mr. A. E. Stokes then seconded the proposition that the report and accounts be adopted, which was put to the meeting and carried unanimously.

It was proposed by the Chairman, and seconded by Mr. H. C. Smith, that Dr. Charles C. Carpenter, C.B.E., be asked to serve again as President of the Association for the coming year. The proposition was put to the meeting and carried unanimously.

GAS INDUSTRIES SECTION



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GAS INDUSTRIES SECTION COMMITTEE

Chairman: E. W. SMITH, C.B.E., D.Sc.

Vice-Chairman: A. W. SMITH.

Representing the

SOCIETY OF BRITISH GAS INDUSTRIES.

H. E. Bennet
C. S. Bennett
Alderman G. Clark, J.P.
Alexander Comley
E. J. Fox
W. J. Gardner
A. L. Griffith
W. H. Handley
Leonard Hartley
D. M. Henshaw
H. A. Hobson
Colonel O. B. F. Planck, D.S.O., D.L.
John Orme
T. F. C. Potterton
F. B. Richards
R. J. Rogers
H. M. Thornton, J.P.
Douglas W. Turner
B. B. Waller
Frank West, M.I.Mech.E.
Albert J. West

NATIONAL GAS COUNCIL.

L. E. Clift
W. J. Sandeman

INSTITUTION OF GAS ENGINEERS.

J. R. W. Alexander
H. C. Smith, M.Inst.C.E.
Frank P. Tarratt, M.Inst.C.E.

BRITISH COMMERCIAL GAS ASSOCIATION.

Fras. C. Briggs, A.M.Inst.C.E.
Sir Francis Goodenough, C.B.E.
J. C. Walker

JOINT GAS CONFERENCE COMMITTEE.

H. C. Smith, M.Inst.C.E.

BIRMINGHAM GAS DEPARTMENT.

G. M. Lewis
A. W. Smith

BIRMINGHAM CHAMBER OF COMMERCE.

Walter L. Chance, J.P.
C. E. Greener
C. Elliott, B.Sc.
H. Eyles

Hon. Secretary: W. L. S. SPINKS,
Gas Department, Council House, Birmingham.

Gas Plant and Apparatus at : : Castle Bromwich : :

An Illustrated Account of the Exhibits in the Gas Industries Section of the British Industries Fair

Alder & Mackay, Ltd.,

New Grange Works, Edinburgh.

A comprehensive range of dry gas meters of the most modern types is shown, and working models with glass panels in place of the usual tin cases permit visitors to follow the action of the dry gas meter.

There are some 275 separate pieces in a prepayment meter, and it speaks highly for the accuracy in production and assembly of these that the finished article is such an accurate measure and that it carries the makers' guarantee for five years. The universal use of gas for cooking, heating, and hot water supply necessitated the introduction of a small-sized meter capable of measuring the increased average demand, and on this stand is found the new

"Small" High-Capacity Meter with "Optional Coin" Attachment.

"Small" high-capacity range of meters. The "Small" 100-c.ft. meter has a badged capacity of more than eight times its 2-lt. prototype of pre-war days. Meters are also shown fitted with the new "optional coin" attachment which allows the consumer to prepay his gas supply with either pennies or shillings at will, but precludes him from obtaining gas with any other coin.

Special test and demonstration meters, meters in cast-iron cases, and other specialties, including street lanterns and the "A. & M." clock controller, are also displayed by Messrs. Alder & Mackay, Ltd.

William Allday & Co., Ltd.,

38A, Paradise Street, Birmingham.

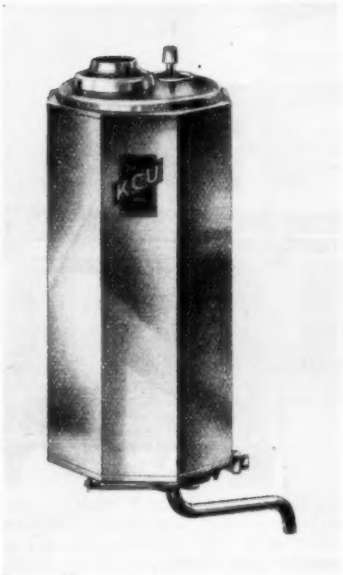
This firm are exhibiting in conjunction with their subsidiary Company, Messrs. A. H. Wilkes & Co., a range of "Alcosa" blowing fans, used for gas furnaces, including the latest silent high-pressure fan working up to 36 in. W.G. Positive pressure blowers for operating gas furnaces, blowpipes, &c., are also shown operating their new type of gas and air blast burner. Various types of automatic gas burners are exhibited in operation, suitable for heating a variety of tools and furnaces. These patent burners are a simple design, being worked by gas pressure. They are entirely free from spring.

There is a comprehensive display of "Wilkes" soldering furnaces, many detailed improvements having been effected during the past year, most important being the advantage of unvarying constant gas consumptions. The gas consumption is adjusted according to the work, and exact working costs per operator may be obtained.

Considerable attention has been given also to refractories, and the improvements have resulted in reduced gas consumption, and even quicker lighting up times. Several sizes of the latest portable forges with easy turning powerful hand fans, fitted with ball bearings, oil bath, machined steel gears, &c., and an extremely useful gas fitters' forge for bending barrel up to 8 in. diameter; also angle iron which operates with gas instead of breeze are to be seen.

Arden Hill & Co., Ltd. (Radiation Ltd., Proprietors),

Birmingham and London.



Arden Hill's "K.C.U." Sink Water Heater.

Among the many exhibits on this stand of particular interest to gas undertakings, there are shown sections of the "Sunhot" water heater and also of the "B.T.U." water heater, which make clear the methods of construction that have gained such popularity for these heaters.

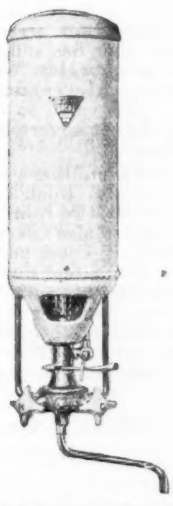
An "Acme" "New World" cooker, with "Regulo" oven-heat control, is on exhibit and also a "Sunhot" water heater, as manufactured by this firm. There is also a "K.C.U." water heater finished in bright chromium plate, which has a high efficiency and has come in for considerable popularity by reason of the elimination of troublesome maintenance charges.

Ascot Gas Water Heaters, Ltd.,

244, High Holborn, London, W.C. 1.

This firm are showing their "Ascot" bath water heater, beautifully finished in white enamel and chromium plate. Its square shape, enamel finish, chromium plating, and

"Ascot" White Enamelled Bath Water-Heater.



Instantaneous Sink Water-Heater.

draught diverter form complete unity with the heater and make it very attractive.

An instantaneous sink water heater is exhibited in a

special white finish, with new improved valve. The "Ascot" multi-point gas water heater type embodies a new design of heating body and improved valve.

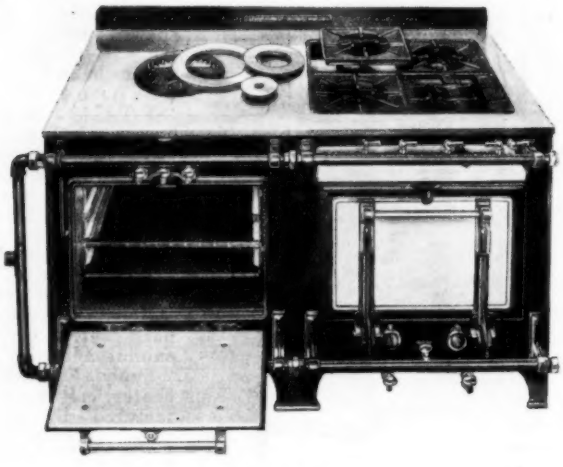
A small storage gas water heater for the sink is shown, embodying new features, and making not only for neater shape and better efficiency, but also for fool-proof operation.

As a special exhibit, attention is drawn to the firm's pilot safety device, which can be fitted to any "Ascot" gas water heater.

Benham & Sons, Ltd.,

66, Wigmore Street, London, W. 1.

This display includes cooking appliances, among which are shown an example of the 2-oven "Solidtop" gas range, a double-deck gas-heated pastry oven, and gas-heated steamer. An example of sink constructed of "Staybrite" is also exhibited.



"Solidtop" Gas Range.

"Solidtop" gas ranges have several new technical features in their design. Ranges are constructed in units, a unit consisting of externally-heated and well-lagged oven and door, with hotplate above. As an alternative to solid metal taps for all units, an "open-flame" pattern can be provided. In "open-flame" sections a grill can be provided if desired.

J. & J. Braddock,

London and Oldham.

Messrs. J. & J. Braddock are showing a full size 12-in. station governor arranged for water loading or weights. The governor has sufficient seal to withstand pressures up to 20 in. of water, but can be arranged for still higher pressures. Also exhibited is a patent retort house governor with a new valve so constructed that high vacuum conditions do not adversely affect the desired conditions in the foul main.

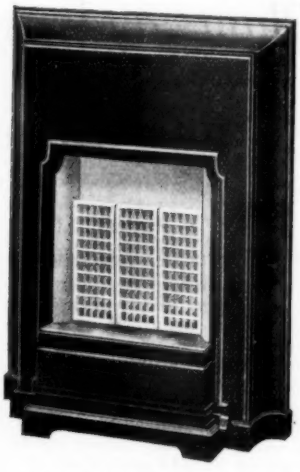
In addition, there are exhibits of standard and high-capacity, also small high-capacity, dry gas meters with their new two-coin attachment and with seamless diaphragms; also glass case meters to show the internal construction; a wet meter with improved drum of ordinary type; a new patent double-drum wet meter, which will pass increased hourly quantities of gas with minimum loss of pressures. Another feature of this meter is that it allows a large amount of water to be evaporated for the 5% range in registration. There are also various forms of pressure gauges and high-class main cocks.

Bratt, Colbran, & Co., and Heaped Fire Company, Ltd.,

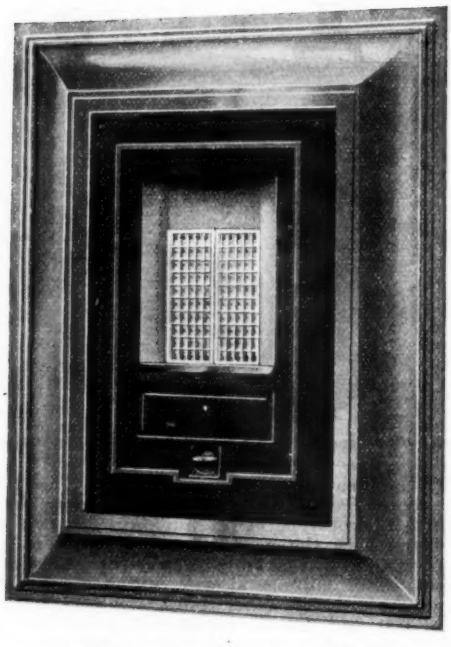
10, Mortimer Street, London, W. 1.

In addition to the inset fires listed during the past season, this firm is exhibiting an entirely new range of independent fires. This series, which they are showing for the first time at Birmingham, and which they have named the "Lulworth," the "Lanark," the "Lowther," and the "Leith," can be fixed in front of any existing fireplace.

They are also showing a new type of wall panel for the "Portello" panel fire which enables this fire to be fixed to an "Economy" flue on a 4½-in. wall. All the fires are seen in suitable marble or tiled settings, and the Company



Bratt Colbran's "Lanark" Fire.



Bratt Colbran's "Portello" Fire in Wall Panel.

are, of course, exhibiting their screen fire and new convector heater.

Geo. Bray & Co., Ltd.,

Leeds.

This firm show their usual wide range of burners for incandescent and ordinary (flat-flame) coal gas, petrol air gas, and acetylene.

The Bray silent regulator which was shown at the last Fair has proved its worth, and, in addition to being fitted as an alternative to most of the Bray burners, it is now an integral part of the new No. 10S burner. This is a burner designed on similar lines to those of the No. 790 series, but is, in parts, of lighter construction. At its low price this burner offers maximum efficiency at minimum cost. It can also be supplied with fixed air supply and air guard to meet the demand for a single-control burner. A new range of Bray bracket burners has been introduced, the improved design and reduced prices of which make them very desirable for landings, bathrooms, &c. The burners shown for street lighting purposes will interest the technical man and engineer.

British Road Tar Association,

17, Grosvenor Gardens, London, S.W. 1.

The stand consists of an attractive cinema theatre, accommodating fifty people, in which the Association's

industrial and general interest talking films entitled "Coal Mine to Road" and "The Highway" are exhibited. Both films have been shown at numerous cinema theatres in different parts of the country, and have attracted a considerable amount of attention. They show that tar is an all-British material, the production and utilization of which gives employment to hundreds of thousands of workers throughout the country.

The general interest film, "The Highway," traces the development of roads since the days of the early Britons, and shows the progress that has been brought about by the use of tar. The British Road Tar Association extends an invitation to all interested in the construction and maintenance of roads to visit the stand, where every opportunity is given to discuss questions relating to the use of tar for roads with technical representatives, who are in attendance, and where they have the opportunity of seeing the talking films above mentioned.

Bromford Tube Company, Ltd.,

13, Victoria Street, London, S.W. 1.

The Bromford Tube Company's stand has been entirely re-designed for this year's exhibition. A full range of wrapped and bitumen coated seamless steel gas mains and fittings are shown, with various types of joints, including a demonstration of the Carlton patent flexible pipe joint. Bromford seamless steel tubes are made in sizes up to 16 in. outside diameter and in lengths up to 60 ft. A special feature of the display is the latest designs in steel lighting columns, guard pillars, and traffic signs.

Cambridge Instrument Company, Ltd.,

45, Grosvenor Place, London, S.W. 1.

Among the new instruments exhibited by this firm are examples of re-designed mercury-in-steel thermometers, both indicating and recording, large diameter chart recorders for pressure and for humidity, new designs of temperature controllers, a portable pressure recorder, and a new CO indicating outfit for measuring small percentages of carbon monoxide gas in tunnels and mines.

The mercury-in-steel instruments are a development from the standard Cambridge index thermometers and thermographs. The principal improvements are in the construction of the bulb, the capillary tubing, and the Bourdon tube, and in the adaptation of the instruments for mercury-vapour thermometry, enabling them to be used for temperatures up to 700° C. or under certain conditions for occasional temperatures up to 800° C.

Similar recorders, with 10-in. charts, are also exhibited for recording pressure, humidity, time of operations of mechanism, &c. Two-pen or three-pen recorders are also made, giving records of different temperatures, or of temperature and other conditions, on the one chart. Examples are shown of indicating and recording thermometers fitted with adjustable contacts for operating alarms or to control automatically the temperature being measured.

An outstanding development in the indication of industrial data is the patented Cambridge illuminated moving-scale indicator. Three of these indicators are being shown on a panel, two showing temperature measurements and the third CO_2 percentages. In this instrument the scale is engraved on transparent material and is optically projected on to a translucent screen carrying a fixed pointer.

A new form of CO_2 metering unit for boiler flue gases is also exhibited. This unit, which employs the Cambridge electrical method, includes no chemicals or delicate glass work.

Cannon Iron Foundries, Ltd.,

Deepfields, nr. Bilston, Staffs.

The Cannon Iron Foundries, Ltd., are the makers of the well-known inclined gas fires with a principle of construction which enables the sloping radiants to be set at the correct angle for uniformly heating the room with minimum gas consumption, and the exacting demands of modern hygiene are fully met by the effective ventilation which the design ensures. The varied tastes of the discriminating are provided for in the art metal and colour finishes. The "Vitaglo" radiant is supplied with inclined fires.

The "Champion" gas cooker embodies several features novel in cooker construction. The oven is a specially designed bottom-flue type, ensuring a large region of uniform temperature, with a cooler zone at the base, while its double insulation gives a large increase of efficiency and prevents condensate. An interesting point is that the oven supply pipe is carried down inside the wall of the oven, which makes for greater neatness, while the gas-air supply can be regulated by means of a worm screw from the front. Another noteworthy feature of this cooker is its deep-fronted hotplate cornice, under which the chromium-plated drop-handle taps are completely hidden so long as they are in the "off" position. The gas supply pipe injectors and other adjustments are also situated under the deep cornice, hidden from view yet easily reached when necessary.

"Beacon" Radiator. "Champion" Cooker.

The "New Challenge" high-grade gas cookers are thoroughly up-to-date, and embody all the modern points of practical construction. The "Superb" enamel finishes in dark or light green, primrose, and cream are of real artistic merit, eminently suitable where special colour schemes are desired. The "Autimo" oven heat controller is reliable and takes charge of the food, giving relief to the busy housewife who can use to advantage the time thus saved. "Suburban" high-grade gas cookers are exceptionally attractive in the "Superb" finishes. Intermediate cookers are well represented by the new models of the "Oxford" and "Cambridge" series.

The "Cannon" "Beacon" radiator is an example of beauty combined with efficiency, and admirably meets the requirements of modern architecture and decoration. It is designed to give the right degree of warmth in halls, corridors, bathrooms, offices, shops, and is particularly suitable for rooms which are subject to draughts or where warm air is constantly being lost through the frequent opening of doors.

Cellactite and British Uralite, Ltd.,

296-302, High Holborn, W.C. 1.

Examples of "Cellactite" steel-cored roofing are shown. This has a steel core completely enveloped in protective bitumen to which is subsequently applied on each side an imperishable asbestos-asphalte felt, having all the endurance of a road asphalte. These coverings are applied under great hydraulic pressure resulting in a perfect bond and a composite sheet that is claimed to outlast the building itself without a single painting or repair. A new feature in "Cellactite" sheeting which is shown is the rough texture finish in colour.

"Uralite" is also shown; this is composed practically entirely of high-grade asbestos fibre. It is not an asbestos cement sheet, which is merely incombustible in itself. The genuine "Uralite" will not crack under high temperature; it will confine a fire to its source.

The ever popular "Urastone" non-corrosible flue pipes and fittings are also shown in extensive range, including new cowls, baffles, &c. The "Shorne" baffle is a specially interesting piece, and, cutting out all embellishments of design, combines efficiency with economy. The "Medway" ventilator, fully described in our issue for Dec. 13 last (p. 779), is also shown.

Asbestos-cement, flat and corrugated sheets, and "Asbestone" are included in the exhibit; together with examples of the same material in tile patterned sheeting, gas cooker bases, &c.

Chesterfield Tube Company, Ltd.,

Chesterfield.

The exhibit of the Chesterfield Tube Company, Ltd., consists of cold drawn weldless steel steam pipes for high-pressure steam installations, and weldless steel cylinders for the storage of oxygen, acetylene, hydrogen, carbon-dioxide, ammonia, &c. Another interesting cylinder exhibit is the new nickel chrome molybdenum steel storage and transport cylinders now being manufactured for gas traction purposes.

Weldless steel headers for boilers and tubes manufactured from the latest corrosion and heat resisting alloy steels are also displayed.

Clarkhills, Ltd.,

31, Vauxhall Bridge Road, London, S.W. 1.

This firm are exhibiting their usual display of water heaters, the Clarkhill "Minor," "Standard," and "Vauxhall." They are also showing for the first time their "Thermo" white porcelain enamel heater. This heater is specially designed for easy maintenance, and the outer casing is so arranged that in the event of the porcelain being damaged it is possible to have a new side, front, or back, instead of having to replace the whole. The inner cover has a removable front, so that it is possible to clean the interior of the heater without the removal of the whole machine, thus saving time and cost with regard to maintenance.

Clarkhill "Thermo" White Porcelain Enamel Heater.

The Clarkhill "Thermo" No. 1 has a 3-gallon per minute capacity and gas consumption of 3 c.ft. per minute. The whole of the interior of the heater is detachable without having to remove the flue pipe or to disturb the outer casing, excepting the front panel which is easily removable by undoing two screws and removing the door.

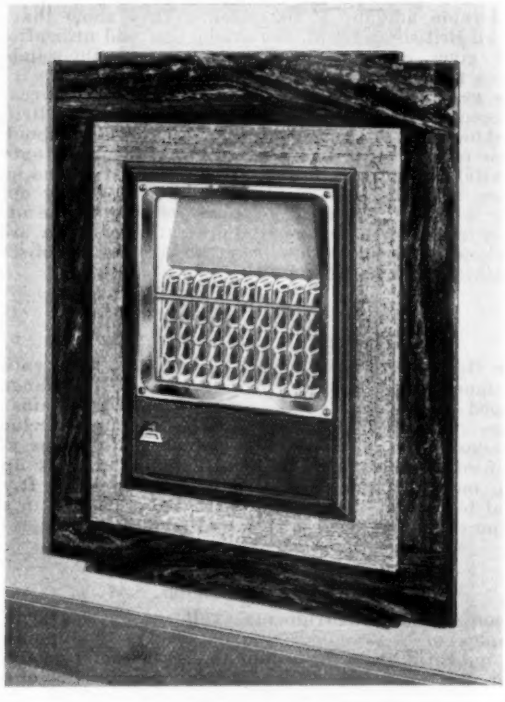
The heater has a swing-out burner, which makes it possible to clean or replace the jets, and at the same time the opening of the door of the heater automatically cuts off the gas supply to the machine. Further, this appliance is fitted with the patent Clarkhill safety control which automatically cuts off the gas should foreign matter enter any part of the automatic valve and cause the gas to remain alight after the water has been turned off. Also, should the water be drawn too slowly at any hot water tap the thermostatic control closes down the gas supply to the burners, preventing overheating of the machine.

Davis Gas Stove Company, Ltd. (Radiation Ltd., Proprietors),

London and Luton.

The Davis Gas Stove Company, Ltd., are showing examples of the special "Beau" colour finish, seen on the "Alpine" "New World" gas cooker and also the gas range, these being in each case, of course, "Regulo"-controlled.

The "Panella" fire has always formed a feature of interest wherever it is shown, and a very fine example is contributed to this year's Fair. The Davis models of the new High "Beam" gas fire—the "Morn" and the "Eve"—will also come in for notice, by reason of their many new features.



Davis' "Panella" Gas Fire.

As manufacturers of geysers that are well-known for safety and efficiency, Davis' have provided a comprehensive display including their "Alpine" geyser beautifully finished in white porcelain enamel, also the ever popular "Shamrock," which is shown fitted on a stand.

Another item of interest is the range of "Balance" radiators which work on the balanced principle and are much used in garages, hospitals, &c., where safety is the first consideration. A "Nautilus" coke boiler completes the exhibits from Luton Works.

W. H. Dean & Son, Ltd.,

Burnley.

Gas-heated wash boilers in large variety of patterns and prices, with or without drawn-off taps, are exhibited on this stand. The firm's patterns include those with outer casing of strong sheet-steel and porcelain enamelled black and white mottled finish. Special wood covers can be fitted which can be reversed to form a small table for kitchens where space is limited. Copper water heaters and counter urns for restaurants, workshops, &c., rustless cast-iron pan boilers for butchers' use in brawn making, gas-heated washing machines, stove piping, corrugated elbows, ventilating caps, tee-pieces, patent bafflers, &c., and the "Maxol" patent geyser for providing boiling water instantly, are among the exhibits.

Bryan Donkin Company, Ltd.,

Chesterfield.

This Company are showing several photographs, among which is one of a high-pressure vertical compressor specially designed for compressing gas to 5000 lbs. per sq. in. for filling cylinders at a filling station for gas-driven motor vehicles. Photographs are shown of turbo exhausters, compressors, boosters, and blowers, of which over 330 have been supplied to gas-works, coke oven installations, &c. Turbo exhausters are made for running up to a speed of 10,000 r.p.m.

The Company have been makers of rotary gas exhausters for nearly eighty years, the total number supplied being upwards of 7000. Models are exhibited of the two blade and three blade type. They are showing a specially designed high-speed rotary machine of the multi-blade type which can be used as a blower, exhauster, or compressor for air or gas, and for which they claim greater efficiency, longer life and more silent working than other machines of the multi-blade type. Another specialty is gas valves. These they have been making over eighty years, and their yearly sales have now reached a total of over ten thousand

valves. Models are exhibited of high and medium pressure double-faced valves, the well-known single-faced rack and pinion valve, and worm and rack valve, and also a disc valve for use with purifiers A high-pressure double-faced valve is exhibited with part of the body cut away to show the internal working of the valve. These valves are made to withstand pressures up to 100 lbs. per sq. in. They are so designed that the bonnet can be removed and a new nut or spindle fitted while the valve is under pressure.

A photograph is shown of a 48 in. diaphragm gas governor at the Nechells works of the City of Birmingham Gas Department. This is claimed to be the largest of its kind in use in this country. There is also a photograph of an installation of special Reynolds high-pressure district governors at Kings Norton which are reducing the gas pressure from 15 lbs. per sq. in. to the normal supply pressure. A model of this type of governor is being shown in a kiosk of a type of which the Company are makers.

They are also showing various types of gas pressure regulators for gas services, meters, stoves, geysers, radiators, &c., a safety cut-off valve, improved clean-easy type lubricators for gas exhausters and blowers, and an oil sprayer for use with oil spraying plants which the Company make for the removal of naphthalene deposits in gas mains.

Economic Household Appliance Company, Ltd.,

Queen Anne Road, London, E. 9.

This firm are showing on their stand examples of their gas kitcheners, combined gas fire and cooker, gas radiators, and gas lighters using small electric batteries.

Electroflo Meters Company. Ltd.,

Abbey Road, Park Royal, London, N.W. 10.

This exhibit comprises Electroflo automatic temperature regulators for controlling the temperature of electric furnaces and the temperature and atmosphere of fuel-fired furnaces; gas flow and pressure indicators and recorders, gas analyzers, single and multiple suction and pressure gauges, indicating and recording pyrometers, thermometers, &c.

The Electroflo automatic temperature regulator (indicating control pyrometer) is unique in the sense that the indicating pointer has no work to do other than that of indicating the temperature; but its position with respect to the depressor movement determines the path to be taken by the selector pin, the path taken determining whether the mercury contactor switch shall be " On " or " Off." In the case of fuel-fired furnaces, the mercury contactor switch is employed to energize a reversing motor-driven valve and/or damper regulator. The operating arm of this regulator is connected by adjustable links to the gas and air or oil and air valves, or valve and damper in the case of natural-draught furnaces.

An alternative instrument is the three-position controller, giving high, low, and mid position. Also exhibited is the Electroflo A.C. synchronous motor-driven continuous strip chart recording pyrometer to record any number of temperatures from one to six.

A novel exhibit is the Electroflo electrically-operated distance indicating and signalling system for application to waterless gasholders. This embodies a transmitter, which is driven by chain and sprocket. The rotation of the shaft raises and lowers a multi-conductor type of resistance in a fixed mercury well, thereby regulating the conductance of the distantly-located electrical reading instrument, which is calibrated in feet, so that the pointer shows the height of the gasholder at any instant and the corresponding gas volume. The signals are made by means of lamps, and the danger positions, of which warning is required, are indicated by various coloured glasses in the lamp boxes. These signals are operated as the shaft of the transmitter rotates by a cam and plunger mechanism positioning mercury contactor switches. A Klaxon warning horn is included, the connections to which are adjustable, so that it can be made to sound at any predetermined gasholder height.

Emscote Foundry Company, Ltd.,

Warwick.

The Emscote Foundry Company have on their stand this year the " Neocoke " boiler. This is a domestic coke boiler of steel construction, and has been approved by the London and Counties Coke Association.

It has been subjected naturally to very severe tests, and has come through these tests with reports indicating high efficiency and economy in fuel consumption.

There is shown on the Emscote stand a range of Emscote vitreous enamel gas cookers. Four sizes are displayed, and these cookers have been designed and manufactured to meet the need for a high-class enamelled cooker at a reasonable price. A feature of the Emscote gas fires is, of course, the patented gas regulator. This regulator, though simple, is most effective, and is claimed to show a substantial saving in gas consumption. It is fitted to all Emscote fires irrespective of price.

Evered & Co., Ltd.,

Surrey Works, Smethwick.

This firm's exhibit includes a large and varied range of lighting fittings—ventilating lamps, pendants, brackets, floodlights, &c., hot-pressed main cocks and brasswork of every description for the Gas Industry, and the following specialities.

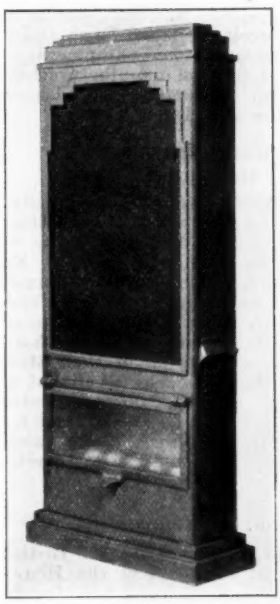
" Evered's " patented " Simplex " distance control is of the pressure type and is small and neat. It is extremely simple in construction, with working parts reduced to a minimum, ensuring easy and trouble-free working. The whole interior is instantly accessible for cleaning by unscrewing the cover cap. It is made from hot brass pressings.

The " Howie " patent burner is of the dome type, specially designed to prevent the rapid discoloration of ceilings and fittings. Also shown are G.L.C. governors, manufactured under licence, and oversink water heater fittings—a neat installation for water heaters, easily and quickly fitted, and eliminating unsightly " wiped " joints.

Sidney Flavel & Co., Ltd.,

Leamington.

A range of Flavel products attractively displayed shows the visitor to this stand new and improved appliances introduced since last year's Fair. The Flavel cooker is now offered in so many styles and sizes that almost any requirement is anticipated. The " Metro " coke fire and " Metro-Log " gas fire may be seen in operation.



Flavel's "Moderne" Panel Heater.

There are two features of special interest here. The " Radiant-Panel " gas heater (preliminary models of which were exhibited at the 1933 Fair) and a new series of " wall-type " gas fire. These two products in their various designs and finishes form a large part of the present display. The " Radiant-Panel " gas heater is shown in three designs which are particularly suited for the buildings of to-day, giving high heating efficiency with a minimum of floor space occupied. The " Moderne " design is illustrated.

The " wall-type " gas fires are produced to suit present-day fireplace designs, and have been carefully thought out with the object of providing architects and others with an efficient gas fire to combine with the latest development in fireplace construction.

Foster Instrument Company,

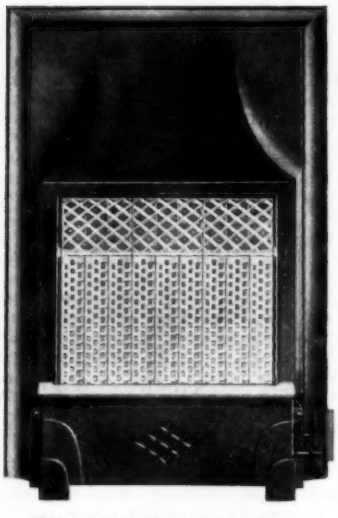
Letchworth, Herts.

In addition to a complete range of electrical temperature measuring instruments, this firm are showing several new pieces of apparatus and are also demonstrating several special applications of their instruments, particularly those applied to steel works practice. Their projected scale indicator is a new instrument primarily designed as a temperature indicator in which a small section of the scale is greatly enlarged and optically projected on to a ground glass screen on the front of the instrument. By this means an extremely long scale is obtained, and at the same time the instrument can be conveniently read from a considerable distance, the reading being clearly visible even under bad lighting conditions.

The firm's alarm dial recorder is a single point temperature recorder of the electrical type available for use with a resistance bulb, thermo-couple or radiation tube so that any temperature from 10° C. up to 1300° C. can be covered. The chart is of the circular 24-hour type and the instru-

ment is provided with an adjustable maximum temperature contact which can be arranged to operate some form of signalling device such as an electric lamp, horn, or bell.

Fletcher Russell & Co., Ltd. (Radiation Ltd., Proprietors), Warrington and London.



Fletcher's High Beam Gas Fire—the "Reynolds."

Fletcher Russell & Co., Ltd., continue their reputation as manufacturers of high-grade appliances, and their exhibit comprises the "Rill" water heater in chromium finish, and a "Celerity" water heater model, finished in blue enamel. The Fletcher "Beau" finishes are distinctive, the two alternatives being Royal Blue and Cream, and Plum Colour and Cream, either of which makes a very pleasing combination.

The "Kingsway" "New World" "Regulo"-controlled cooker has been sent in as an example of this "Beau" porcelain enamel finish and is a worthy representative of domestic kitchen equipment.

The new High "Beam" gas fire as manufactured by Fletcher's, has been called the "Reynolds" and shows evidence of careful craftsmanship and clever design.

Foster & Pullen, Ltd.,
Avil Works, Crossley Hall, Bradford.

This firm are exhibiting selections from their extensive indoor and public lighting specialties, notably their "strip" lanterns in various styles and sizes, many of which figured prominently in floodlighting scenes in St. James's Park and throughout the country the summer before last. They also show spot lamps, one of which makes specially prominent figures of policemen on point duty and another which, with its upward as well as horizontal beam, being by way of a variation of their strip lantern, is applicable alike for the rendering prominent of point duty men as well as numerous other more extended purposes. A catalytic device is shown on their stand for attaching to the controllers of street lanterns, doing away, it is claimed, with the whole system of by-passes, thereby effecting great economies.

Gas Industry Information Bureau.

The central information bureau, provided by the British Commercial Gas Association and members of the Heavy Section of the Society of British Gas Industries, has already proved its value at previous Fairs. It was designed by Mr. H. Austen Hall, Consulting Architect to the British Commercial Gas Association, and has been re-decorated to conform with the red and cream colour scheme of the Gas Section. Expert salesmen, lent by gas undertakings, are on duty to answer visitors' inquiries and to supply information and statistics on every domestic or industrial problem connected with gas.

The two lounges have been entirely re-decorated. They allow visitors to discuss problems in comfort, and a set of photographs enables the business man to get a rapid survey of the activities of the Gas Industry. Among the appliances displayed are examples of the heat treatment of metals, a full range of bye-products, and examples of graded coke.

In addition to the British Commercial Gas Association the contributing members of the Society of British Gas Industries (Heavy Section) are:

Aldridge & Ranken, Ltd.
Bryan Donkin Co., Ltd.
Chemical Engineering and Wilton's Patent Furnace Company, Ltd.
Clapham Bros., Ltd.
Clayton, Son, & Co., Ltd.
Robert Dempster & Sons, Ltd.
R. & J. Dempster, Ltd.
Derbyshire Silica Firebrick Company, Ltd.
Drakes, Ltd.
Firth Blakeley, Sons, & Co., Ltd.
Gas Chambers and Coke Ovens, Ltd.
Goodall, Clayton, & Co., Ltd.
W. C. Holmes & Co., Ltd.
Meltham Silica Firebrick Company, Ltd.
Newton Chambers & Co, Ltd.
Oughtibridge Silica Firebrick Company, Ltd.
Oxley Engineering Company, Ltd.
E. J. & J. Pearson, Ltd.
Stewarts and Lloyds, Ltd.
F. C. Sugden & Co., Ltd.
Joseph Taylor (Saturators), Ltd.
George Waller & Co., Ltd.
Wellington Tube Works, Ltd.
West's Gas Improvement Company, Ltd.
Whessoe Foundry and Engineering Company, Ltd.
Willey & Co., Ltd.
Woodall-Duckham Vertical Retort and Oven Construction Company (1920), Ltd.

"GAS JOURNAL"
and
"GAS SALESMAN"
&c., &c.

As throughout the 85 years of its existence, so at the Fair, "Service" is the motto of the "GAS JOURNAL," and Walter King, Ltd., look forward to meeting their very many friends.

Walter King, Ltd.
Stand C327

Gas Meter Company, Ltd.,
238, Kingsland Road, London, E.

The Gas Meter Company, Ltd., are showing their new range of square-case small high-capacity dry gas meters—both ordinary and prepayment type. For demonstration purposes, working models of these meters are shown, fitted with glass back, front, and top. The two-coin optional prepayment meter, which operates with shillings and pence in one slot without any adjustment, has a glass cover to the mechanism. The new pattern arc valves are clearly seen in these models.

The prepayment meter is fitted with a new sure-seal prepayment valve which will seal correctly even if the valve pad is out of alignment. A model of this is available for demonstration. There are also models of valve plates showing the arc valve and the ordinary straight valve as fitted to the various meters manufactured by this Company.

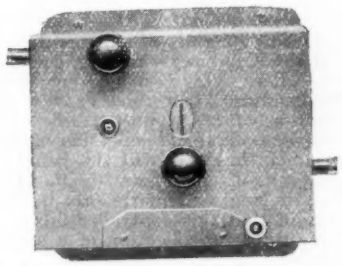
A demonstration meter fitted with an 18-in. dial and a large adjustable hand shows the cost of gas being consumed at the Gas Meter Company's stand. The dial has large figures indicating the value of gas consumed during an exhibition of, say, a cooking stove or fire. Feetage is also marked on the circumference and the pence figures may be adjusted to the price of gas in the district.

A new 50-ft. small high-capacity gas fire prepayment meter fitted with direct-reading index (which will be able

to be supplied for use with any coin) is to be seen. This meter is housed in an extremely neat metal cabinet with door, the cabinet having an art finish of bronzed gold which has a very pleasing appearance and would harmonize with the decoration of any room.

Gas Meter Company's Demonstration Meter.

A specimen new valve with clock attachment is shown, by means of which gas may be prepaid and supplied at the rate of 6d. for two hours. This is of particular interest to hotel proprietors. If the guests require a fire and insert 6d., the valve is operated and the clock comes into action. In the event of their requiring gas for a portion of the two hours only, a supplementary cock is provided to shut off the gas supply and to stop the clock which may be re-started at a later hour by again operating the supplementary cock.



Time Switch for Gas Fires by the Gas Meter Company.

An unusually interesting range of clock controllers is exhibited. These demonstrate the many uses to which this apparatus may be applied. The "London" and "Kingsland" are both shown fitted in iron all-weather cases for use with **U** fixings; also special attachments to the "London" for cutting out operation on any particular day or days of the week.

General Gas Appliances, Ltd.,

Corporation Road, Audenshaw, Manchester.

Modernistic in design, this stand is once again divided into sections, enabling the apparatus to be shown to the best possible advantage.

Displayed on the outside of the stand is the full series of "Governor-General" gas cookers with single-burner and automatically-controlled oven. Special attention is called to the three smaller sizes of this range of cookers, which are now supplied on high legs. The marked improvement and the development in enamelling of gas cookers is well shown in the beautiful variety of finishes—namely, new-art, marblized enamel green, black and cream, mottled grey, and the well-known standard finish of lilac blue. In addition, there is the complete series of "Deputy-General," "Villa-General," and the "Easy-General" gas cookers. A new model of special interest is the "Resident-General" gas cooker, specially constructed to avoid stooping when cooking and, also, to occupy the limited space available in bungalows, small residences, and flats. Fitted to several of the cookers is the patent combination splash plate and table top which can be used as a plate rack or table top as desired.

Exhibited for the first time is the "Vogue-General" series of gas fires incorporating the "Vortex" burner and the "Magna Plus" fuel. The fires, which are shown in tasteful settings, are of modern design, artistically finished in pleasing colours.

Steam and steamless radiators in the new and attractive paint finishes are shown, together with a selection of hot water apparatus in operation, including the General "Immersion" indirect water heater, and also the "Aqua-General" wall type sink heater.

Gibbons (Dudley), Ltd.; and Gibbons Bros., Ltd.,

Dibdale Works, Dudley.

The principal exhibit shown by these firms on their stand is a working example of a muffle furnace for vitreous enamelling, which is fired by Birmingham gas. The muffle illustrates both the great saving in firing made possible by its novel features and the growing use of town gas as an industrial fuel.

Messrs. Gibbons Bros., Ltd., also exhibit photographs of contracts carried out during 1933. These illustrate the efforts made by this firm to increase the use of town gas for industrial purposes, and it is interesting to note that they have built furnaces and kilns during the year for such varied operations as vitreous enamelling, bright annealing copper, annealing steel files, and firing earthenware pottery.

Messrs. Gibbons (Dudley), Ltd., exhibit representative examples of their well-known refractories, including sillimanite carborundum, silica, and highly aluminous blocks, bricks, and special shapes.

George Glover & Co., Ltd.,

Chelsea, London, S.W. 3.

High-capacity meters of all types and sizes form the chief exhibit on this stand. Messrs. George Glover & Co., Ltd., have added to their range a small high-capacity series in both ordinary and prepayment types. Sectional models of this new series provide a ready method of examination, and the new methods of construction will interest all those who appreciate the need of simplicity and strength in these all-important measuring instruments.

A George Glover Gas Meter.

The "Chelsea Two" prepayment mechanism has been improved in many details, and its simplicity is demonstrated by various working models. The "Ranelagh" meter is again on view. The salesmen's demonstration meter, first introduced by this firm at last year's Fair, has met a long felt want, and again forms a prominent feature of the exhibit.

In view of the interest aroused in Messrs. George Glover & Co.'s method of lubricating large high-capacity meters, demonstrations of this feature are available to all interested.

Thomas Glover & Co., Ltd.,

Gothic Works, King Edward's Road, Birmingham.

This firm are exhibiting a number of glass case meters working out their respective capacities by means of compressed air. Various other products of the firm's manufacture are also to be seen on the stand.

Grant & West, Ltd.,

17, South Street, London, E.C. 2.

This Company are exhibiting "Selek" metal-to-metal jointing material in powder form, which in practice forms a non-oxidizing, non-rusting joint, guaranteed to make tight and keep tight joints under the most exacting jointing conditions, such as steam, super-heat, water, gas, alcohol, spirits, chemicals, &c.

"Belfo" is a British-made belt treatment for all forms of belting, including leather, hair, balata, cotton, composition, link, and so forth. It is a belt food, distinct and apart from a belt dressing, and while making the belt slip-proof, at the same time feeds and preserves a belt, improving its life, and rendering it impervious to the destructive action of workshop conditions. "Ropres" is a new product especially designed for the treatment of steel wire ropes and cables used for haulage, and kindred conditions. The effect of "Ropres" is to penetrate right into the heart of the rope, lubricating each individual strand, and rendering the rope water-proof, damp-proof, and acid-proof. "Plastiloy" is a plastic metallic packing, having the advantage that it is a one-size packing for all sized rods and glands. It is anti-frictional, self-lubricating, and the anti-frictional metal in its composition has a very high melting point.

"Flinso" is a tinning compound for effectively tinning and soldering all metals, except aluminium, without previous cleaning and preparation. "Flinso" aluminium solder is for soldering aluminium to aluminium and to other metals. The firm are also exhibiting sundry engineering tools.

John Harper & Co., Ltd.,

Albion Works, Willenhall, Staffs.

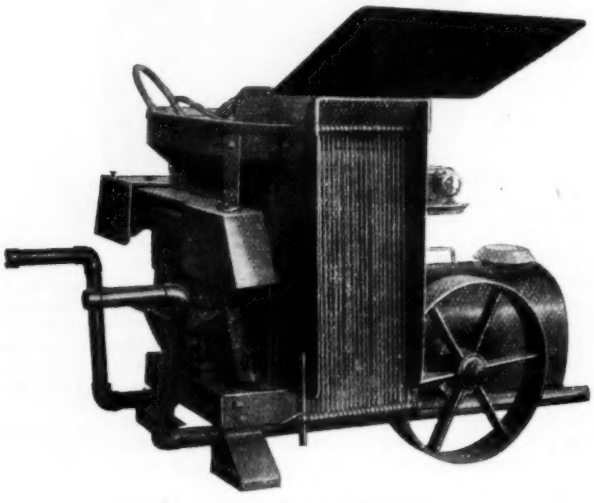
This exhibit covers the firm's range of "Beatrice" gas cookers, fires, and radiators in a variety of designs. The introduction of colour on gas fires has enabled the presentation of an attractive range of finishes in Chinese lacquer in the following colours: Metallic bronze, maroon, dark blue, light blue, sea green, and sage green, in addition to the usual art black and vitreous enamel. All models and colours are on view.

The new No. 34 cooker is also displayed in combinations of colours, blue and cream, green and cream, blue snowdrift and green snowdrift, and the full range of cookers are shown in standard grey mottle finish. The "Beatrice" cookers are designed for easy cleaning; there are no sharp corners or recesses to collect dirt and grease, and the porcelain enamelling is of the highest possible quality. The "Beatrice" oven control can be incorporated in any of the cookers.

W. C. Holmes & Co., Ltd.

Whitestone Ironworks, and Turnbridge Foundry, Huddersfield.

This stand comprises a lounge for interviewing visitors, and an open stand, on which the following are exhibited:



Holmes' V.S.K. Oxide Breaking Machine.

Holmes-Connersville meter; a B-M consumers' meter measuring the gas used on the stand, its action in operation being visible through a glass top; a Holmes double-faced Western type valve, constructed with an open body to enable the design and action to be seen; and a Holmes V.S.K. oxide breaking and conditioning machine, which machine is also applicable to the mixing and aerating of foundry sand. This machine is being exhibited for the first time at the British Industries Fair.

In the outer side walls of the lounge there are fitted animated flow diagrams of a benzole rectification plant, and an effluent liquor purification plant. On the outer front wall of the lounge several transparent photographs on linen are shown, illustrating other Holmes activities such as complete bye-product plant, exhausters, boosters, station meters, ammonia concentration plant, air blowers, "Dri-Gas" plant, purifiers, gasholders, &c. It is interesting to note that the illumination of the pictures is carried out from the back by gas light.

Horstmann Gear Company, Ltd.,

Newbridge Works, Bath.

A wide range of "Newbridge" clock controllers is again displayed, and this year added prominence is given to the "Newbridge" controller with catalytic torch ignition, which dispenses with a by-pass save for a few minutes just at lighting time. Improvements have also been incorporated in "Newbridge" by-pass ignition patterns. Controllers for industrial purposes are also displayed, and the Company reports a greatly increased demand for this type of appliance.

"Newbridge" Time Tariff Controller.

As usual, prominence is given to "Newbridge" gas lighting and gas fire switches. Both types of switch are increasing in popularity and large quantities are now being sold. "Newbridge" house service governors and the G.L.C. safety cut-off valve are also displayed.

We cannot pass this stand without mention of the latest development of this Company—namely, the "Newbridge" time tariff controller. This is a new mechanism designed for the collection of weekly service charges in connection with the operation of a two-part tariff. The problem associated with the economical collection of service charges from slot consumers has retarded the general application by gas undertakings of a two-part tariff. This apparatus is the outcome of lengthy experiments by the Company, and it can be said that this controller fills a definite need as regards the automatic collection of a service charge.

Hurry Water Heater Company,

39, Broad Street, Birmingham.

Several interesting new appliances are shown among the domestic water heaters exhibited on the stand of the Hurry Water Heater Company. Sectional assemblies of interest to gas engineers illustrate the construction of a new gas-heated boiler which is claimed to achieve a very high degree of efficiency. An appliance that is being considerably used in slum-clearance work, on account of the economy of building costs effected by avoiding back-range boilers, is shown in the "Hurro" dual-purpose boiler. In municipal housing schemes during recent years this boiler has widely demonstrated its particular applicability to the smaller type of house. As it feeds the bath with hot water by an application of the thermal-siphon principle, it achieves another desirable object by permitting the bath to be in a room entirely separate from that portion of the house in which it is most convenient to place the boiler. For use with hand basins, kitchen sinks, or baths various types of sealed and open storage heaters in several capacities are exhibited. An interesting innovation is the hairdresser's model fitted with hose and spray, with only one control for the flow of hot, tepid, or cold water as required.

The latest models of the well-known "Ottawa" storage water heater are available in 12 to 50 gallon capacities, and closely allied to it is the "Hurro" domestic cabinet, which combines heater, hot-water storage, and clothes-airing cabinet.

In their planning for low hire charges and long-term hire purchase, gas undertakings will be interested in the new "Pennant" circulator heater. Considerable reduction in maintenance costs is claimed for this model on account of the extensive use in its construction of gun-metal and stainless steel. The simplicity of its design allows for speedy dismantling and re-assembly.

Silas Hyde,

Evelyn Road, Greet, Birmingham.

On this stand are exhibited examples of ovens for enamelling, japanning, lacquering, drying, core-drying, and heat treatment; also dust and fume exhausting systems, machine guards, and general sheet metal and iron-plate work.

Industrial Research Laboratories,

Gas Department, Council House, Birmingham.

The entire stand is devoted to an exhibit of testing machinery and apparatus suitable for investigational and research work on ferrous and non-ferrous materials, as well as on such material as brickwork, concrete, and roofing tiles.

The exhibit as a whole is representative of the laboratories which are already installed in the Gas Department at the Council House, Birmingham, and are largely used by engineers and manufacturers in Birmingham and other portions of the Midlands.

The main item shown is a 50-ton self-indicating Universal testing machine, manufactured by Messrs. W. & T. Avery, Ltd.

To correlate the tensile strength of materials with the various hardness factors, a 10 m/m. ball dead weight hardness testing machine, and a direct hardness testing machine using a small ball or diamond, are shown.

In connection with the determinations of brittleness and fatigue strengths of materials, the 120 foot-pound Izod machine and a Wohler fatigue testing machine are exhibited. For testing materials for suitability of pressing operations, the Haas sheet metal tester is on the stand.

In many specifications recently issued, proof loading for tensile tests is called for instead of the usual yield-point determination, and a Rawson dial extensometer will be used for this purpose.

For routine tests on springs, a machine of 150-lb. capacity is being installed.

A characteristic which laboratories are often called upon to determine for some of the newer alloys is their specific gravity, and a direct reading machine for rapid determinations is on view.

Other items consist of apparatus for carrying out tests on lubricating oils, analysis of flue or exhaust gases, together with other special instruments installed in a modern testing laboratory.

The whole of the machinery and apparatus is demonstrated by technical assistants, and during the period of the Fair it is intended to carry out tests free of charge on material from other exhibitors' stands, a special certificate being issued.

Joint Industrial Gas Exhibit.

Organized by the British Commercial Gas Association.

The idea of a joint Industrial Gas Exhibit was given a trial on a comparatively small stand in the Gas Section at the British Industries Fair in 1933. The exhibit was undoubtedly a success; and this year there is a much larger stand, occupying the whole of one island. It has been arranged by the British Commercial Gas Association in co-operation with the Gas Light and Coke Company, the City of Birmingham Gas Department, the Sheffield Gas Company, and the Newcastle-upon-Tyne and Gateshead Gas Company, which undertakings have very large industrial consumptions within their areas of supply.

The Gas Undertakings who have jointly arranged the special exhibits on this stand have endeavoured to make the appeal as wide as possible by providing examples of apparatus and furnace to meet possible demands of manufacturers, from the small jeweller to the steel manufacturer.

It has been impossible adequately to demonstrate, even on this greatly enlarged stand, the many thousands of processes to which gas is applied in some form or another in the industries of the country, but the selection is as representative as possible with the space available, and without overcrowding.

Each furnace or appliance is, or can be, easily connected to gas supply or air supply if necessary, and can therefore be demonstrated at work. In the case of several furnaces a continuous supply of work has been arranged, so that the gas furnaces can be seen operating under what amount to practical working conditions.

Automatic temperature and atmosphere control are special features of several of the exhibits.

This exhibit is intended to fulfil several purposes. It will keep before the manufacturer the fact that gas is being used in rapidly increasing quantities as a fuel in industry, also bringing to his notice the improvements in the design of gas-heated furnaces and appliances which are continually taking place.

The following is a description of the exhibits:

Gas Light and Coke Company.

Blowpipes (Fletcher, Russell, & Co., Ltd.).—These are made in a range of sizes and are suitable for all kinds of brazing, silver soldering, and general workshop use. They are usually designed to work with gas at ordinary pressure and air at approximately 1 lb. per sq. in., but can also be used with high-pressure gas or mixture gas.

G.L.C. Type "A" Muffle Furnaces (Supplied by Selas Gas and Engineering Company, Ltd., Selas Works, City Road, Manchester 15).—An entirely new design of gas-fired muffle furnace, suitable for operation at all temperatures up to and including 1000° C. The smaller sizes of G.L.C. Type "A" muffle furnaces are suitable for numerous laboratory and experimental uses, such as testing of materials at various temperatures, assaying, metal and other heat treatments, enamel work, pottery and glass firing, many kinds of analytical work, and a wide variety of other purposes. The larger sizes are for actual productive work as well as experiments and tests on a bigger scale. Muffle temperatures are exceptionally uniform with a maximum variation of *plus* or *minus* 5° C., ensuring extreme accuracy in all heating operations. Heating from cold is unusually rapid and gas consumption very low with all sizes, as will be gathered from the performance data below. All sizes of G.L.C. muffle furnaces are constructed of cast and sheet aluminium casings to minimize radiation losses. The external surfaces of the casings are highly polished, imparting a most attractive finish.

The casings are lined with an entirely new grade of semi-insulating refractory material possessing remarkable characteristics in rapid heat transfer and low heat losses by conduction. The linings are built of specially shaped sectional blocks. The muffles normally supplied are of refractory clay, but muffles in silica-carbide, heat-resisting steel, or other special materials can be provided.

The cast iron air-cooled burner is fitted with special nozzles, and has a machined air-regulating plate ensuring accurate control of combustion conditions. Burner jets are individually made to suit the quality of gas available. A G.L.C. patent gas governor is fitted to ensure that firing conditions are unaffected by gas pressure fluctuations. The pyrometer equipment is made by Elliott Bros. (London), Ltd. It comprises a carefully calibrated temperature indicator in robust enamelled metal case with aluminium bracket for mounting on the furnace back-plate, Alchro thermocouple with porcelain sheath and insulated leads, all capable of giving accurate temperature indication.

Ordering of pyrometer equipment with the furnace is optional.

Internal Dimensions of Muffle.			Performance Data with 500 B.Th.U. Gas.		
Depth. Front to Back.	Width.	Height. Front to Back.	Time to 1000° C.	Gas Rate Heating from Cold.	Gas Rate Maintaining at 1000° C.
In.	In.	In.	Mins.	C.Ft./Hr.	C.Ft./Hr.
4	2½	2¾	30	15	12
6	4	3	40	30	25
8	5	3½	45	50	40
10	7	4	60	75	60
12	9	5½	75	105	85
14¼	11½	5¾	80	140	110

G.L.C. Assay Furnace.—A special design of muffle furnace suitable for any operation, carried out at temperatures from 700° to 1100° C. for which highly oxidizing atmospheres are required. Assaying consists in heating samples of noble metals to temperatures approximating to 1000° C. in a current of warm air, the effect being to oxidize any base metals and cause them either to be absorbed by the cupel or carried away by the air stream. The furnace is built up with a muffle measuring 6 in. by 11½ in. by 15¼ in. which is connected to a supply of air preheated by the waste gases and which leaves the muffle by a special flue fitted with a trap in which any base metal oxides can collect. The heat is supplied by six refractory tipped burners from which the flames pass around the combustion space surrounding the muffle in such a way that they never play directly on to the muffle. From the combustion chamber the gases pass around the recuperators in which air is preheated for combustion and for the muffle purge. Another special feature of the furnace is a flue damper mechanism, which is connected to the main gas control tap, so that, as the gas supply is closed, the flue is auto-

matically restricted and the passage of excess air through the furnace is avoided.

The results obtained are as follows:

Time to reach 1000° C.	1¾ hours
Full gas rate	0·55 therm/hr.
Maintenance rate for 1000° C.	0·32 therm/hr.

G.L.C. Soldering Stove (Selas Engineering Company, Ltd.).—This new type gas-fired soldering stove has been specially designed to facilitate the process of soldering by ensuring the provision of a clean bolt at the right temperature. The muffle accommodates three small bits at one time so that a number can always be under heat and kept ready for immediate use. The muffle is of special non-scaling and heat-resisting steel, is held to the front plate by four screws, and may be easily withdrawn. The flue gases are completely innocuous, so that the stoves may be used in any location without extended flues or special means of ventilation being necessary.

Conveyor Furnace (Incandescent Heat Company, Ltd.).—This furnace is equipped with a nichrome woven wire belt which is driven from a small electric motor through a reduction gear. It is fired by a series of patent incandescent gas-fired burners, and the temperature can be readily controlled between critical limits. The type of furnace is suitable for annealing small glass articles, and also the heat treatment of metal parts as used in the telephone, radio, and electrical trades. It is simple in construction and economical in gas consumption.

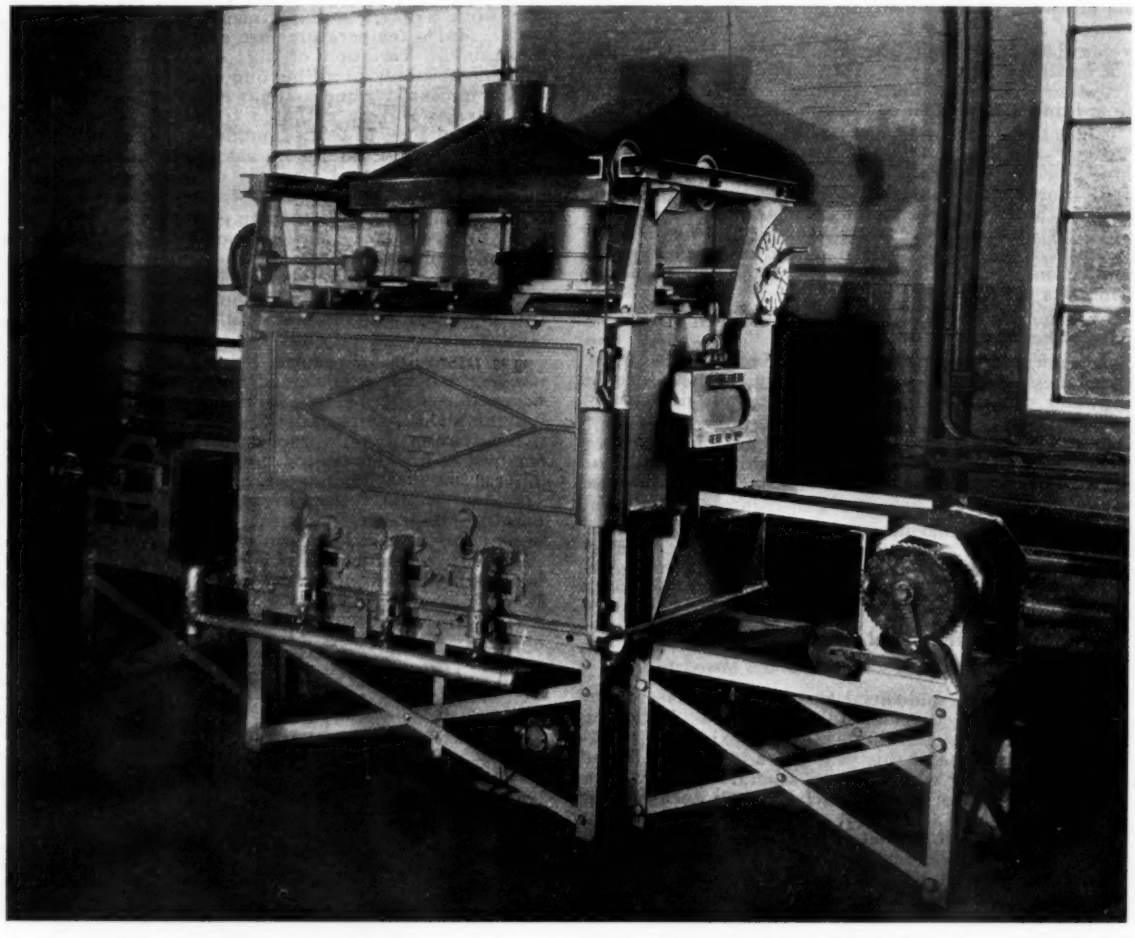
Crucible Furnace 30-lb. Capacity (British Furnaces, Ltd.).—Designed for the melting of metals, such as brass, copper, gun metal, &c. The furnace has a cylindrical combustion chamber into which the crucible fits, and is heated by a single flame firing tangentially into this chamber. The flame is generated by low-pressure gas and blast air, or, if temperatures over 1400° C. are required, by high-pressure air regulated by British Furnaces type automatic proportioning device. The temperature is therefore adjusted by means of the air supply only, the pressure gauge serving to indicate the rate of heat input. In operation the furnace gives very quick heating up and has a high maximum working temperature (about 1650° C.); moreover, the control of the air-gas proportioning makes it extremely simple and economical.

Steam Boiler, Gas Fired (Constructional Engineering Company).—Can be used in many trades, for varieties of purposes, falling into three main classes: (*a*) Where pressure only is required; (*b*) where heat only is required; and (*c*) free steam process work.

20-Gallon Copper (Benham & Sons, Ltd.).—These coppers are particularly suitable for the heating of wax, fats, chemical solutions, syrups, &c.

Model Tilting Furnaces.—A scale model of a lip axis tilting furnace which takes a 3-in. crucible and is capable with air-blast firing of melting brass, copper, &c.

G.L.C. Combustion Furnace (laboratory size).—This furnace constitutes a considerable advance in the economic application of coal gas, only consuming 16 c.ft. per hour for the maximum temperature of 1200° C. without air under pressure. This makes the furnace suitable for rapid determination of carbon in steel by the volumetric absorption method devised by Stropleim. The casings are finished in polished aluminium, being lined with refractory insulation brick, the tube being of alundum having ⅜-in. bore.



A CONVEYOR FURNACE BY THE INCANDESCENT HEAT COMPANY SHOWN ON THE STAND OF THE JOINT INDUSTRIAL GAS EXHIBIT ARRANGED BY THE B.C.G.A.

G.L.C. "Unit" Air Heater (James Keith & Blackman Company, Ltd.).—The Unit comprises a special gas radiator fitted with an electric fan. It should be suspended about 8 ft. to 10 ft. above floor level, and will deliver a steady flood of warm air which is deflected to the floor by adjustable louvres. The air is never in contact with the flames or burnt gases, and is delivered in a perfectly clean condition. This type of heater is eminently suitable for heating of factories, workrooms, &c. The capacity is 1500 c.ft. of air per minute, raised through 48° F.; gas consumption, full on, 1 therm per hour.

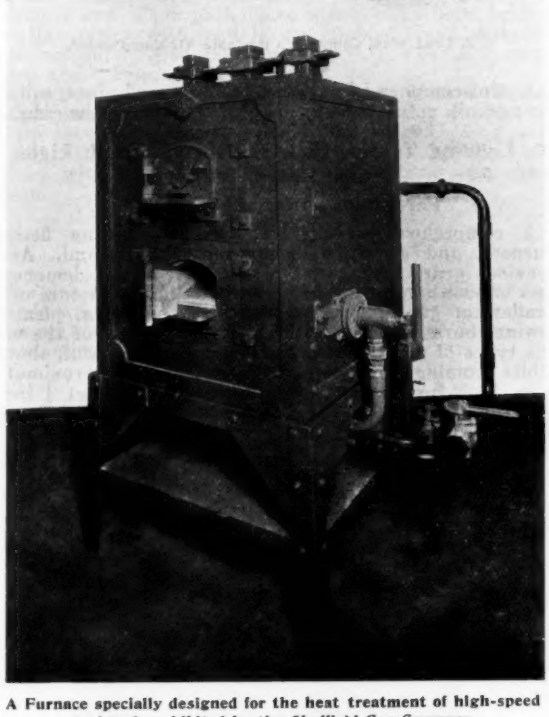
Birmingham Gas Department.

Forge Furnace.—A large number of inquiries have been received by the Birmingham Gas Department recently for gas-fired furnaces for forging, and a number of furnaces installed in various Birmingham works for special forging

operations where freedom from scale and refinement of product are essential. The furnace exhibited is of a standard type, having a hearth area approximately 18 in. by 9 in. by 9 in., and of comparatively simple construction. Special attention has been paid to the burner equipment, and this is standard, the inspirator and burner nozzles being made by British Furnaces, Ltd., incorporating their proportioning device and single tap control. Gas at ordinary town pressure is used, with air at a pressure of about 2 lbs. per sq. in.

Bakelite Press.—A large number of presses making articles in Bakelite and similar material are fitted with direct gas-heating equipment. The press shown on the stand is made by Messrs. Geo. Finney & Co., of Birmingham, and the burner equipment has been specially made by the Birmingham Gas Department with a view to demonstrating the correct use of gas in presses of this kind. The temperature of the platens is controlled by a special thermostat made by the Cambridge Instrument Company, Ltd. The press is shown continuously at work producing small ash-trays in Bakelite material.

Laboratory Testing Oven.—A great amount of attention is being paid to the carrying out of drying operations in various types of drying stoves by means of heated air in circulation, and this stove is shown as a type of oven used for drying operations in large laboratories, and also serves as a useful example of the principle of applying heated air to drying operations generally. The stove is constructed



A Furnace specially designed for the heat treatment of high-speed steel tools exhibited by the Sheffield Gas Company.

by Messrs. F. J. Ballard & Co. The air is heated by a separate gas-fired heater mounted on the top of the stove, and is equipped with a complete system of air circulation, including the necessary fan. This small stove embodies all the features of the latest type of gas-fired plant with air circulation, which is finding considerable favour for all forms of drying operations.

Nickel-Plating Vat.—Large quantities of gas are consumed in plating shops in Birmingham and elsewhere. The plating vat shown is a standard, constructed in wood, with a tubular system of heating. Lead-covered steel tubes are an integral part of the construction of the vat, and a flame from a gas burner is made to play into one end of each of these tubes. This form of heating is particularly satisfactory where only slight temperature rises are required, as in the case of many plating vats.

Bornkessel Burners.—Messrs. Chance Bros., of Smethwick, have recently completed arrangements whereby they are making the whole range of Bornkessel burners, and a representative collection of these is shown as a special exhibit on this stand. The main features of the with gas at ordinary pressure and air under pressure of wide range of sharp small flames giving pin-point conditions are available, which conditions are essential for many fine operations, particularly in the glass industry. Such burners are used singly or in multiples for many glass-cutting and finishing operations.

Furnace for Hot Brass Stamping.—The heating of billets of varying sizes, from ½ in. to 2 in. diameter, or even larger in some cases, for pressing between dies, has developed within the last few years to an industry of considerable magnitude. Gas furnaces are used in Birmingham and elsewhere to a very great extent for the heating of these billets. The general furnace is direct-fired, fed with gas at ordinary pressure and air under pressure of about 1 lb. per sq. in. This furnace is representative of the types which are used in this particular industry.

Salt Bath Furnaces.—The salt bath process is represented on this stand by two furnaces, one made by Mr. John F. Askam, of Birmingham, the other by Brayshaw Furnaces and Tools, Ltd., Manchester, each embodying a special arrangement of handling which has been designed by the firm concerned.

Air Supply.—The air supplies to all the furnaces requiring it on this stand are provided from a new design and type of high-speed blower made by the Bryan Donkin Company, Ltd., of Chesterfield. This blower is multi-bladed, and has many points in its favour over the standard types of blower generally used—particularly the question of noise is reduced to a minimum.

Heat Treatment.—The Birmingham Gas Department is also co-operating in a special manner with the Newcastle-upon-Tyne and Gateshead Gas Company in the provision of a continual supply of work for heat treatment in the furnace which forms the Newcastle exhibit. The furnace is being operated each day by practical workmen carrying out practical heat treatment on work which has to be put immediately into general use.

Temperature Measuring Instruments.—The various furnaces on the stand are fitted with automatic control and pyrometer apparatus by the following firms: Electroflo Meters, Ltd.; the Cambridge Instrument Company, Ltd.; Elliott Bros., Ltd.; and the Foster Instrument Company.

Improved Salt Bath Furnace.—The new improved Brayshaw salt bath plant has been designed to meet modern stringent requirements of efficient control of temperature, gas economy, and production in such industrial heat-treatment processes as the heating of carbon steel and carburized work, for hardening, the quenching and secondary hardening of high-speed steel, cyaniding, &c.

The plant consists of the furnace, automatic stirrer, and gas and air proportioning valve. The furnace is strongly constructed from castings and mild-steel sections and plates, lined with high-quality refractories backed by a good thickness of high-grade insulation. The pot is of mild steel, pressed from the solid, and treated by a special process which improves its working life.

Heating is effected by burners arranged for town gas in conjunction with fan pressure air at 14 in. W.G. The burner is arranged to play tangentially to the pot from the top of the furnace, so that the flame is directed spirally round the pot, the products of combustion finally exhausting from the bottom of the furnace into a brick-lined flue chamber, controlled by a damper working connection with the gas and air proportioning valve. This arrangement ensures evenness of temperature, and local heating of the pot is eliminated.

The incoming pressure air is preheated by waste products of combustion, this being effected by passing the air pipe through the flue chamber of the furnace. Waste products are also utilized to heat a work preheating muffle built in the flue chamber, and this is especially useful in preheating the work before insertion in the salt, thus conserving time and gas consumption. Furthermore, the insertion of the preheated work prevents the salt splashing. A counterbalanced rising and falling work-tray is fitted, which greatly facilitates working, and the tray acts as a stirrer in the molten melt. Special provision is made for a pyromter to be inserted in the liquid, and for protecting it against mechanical damage.

The automatic stirrer is of special importance, since extensive experiments have proved that mechanical stirring ensures uniformity of temperature, increases output, lessens gas consumption, and lengthens the life of the pot. The increased output is caused by the rapid heating of the work which is accomplished without any loss in the uniformity of heating. The gas consumption is lowered because the salt in motion takes the heat more rapidly from the pot, which means that the melt is heated more rapidly and at the same time the temperature of the pot is lowered, with a corresponding increase in life.

The stirrer, which can be supplied either belt or motor driven, is controlled by a foot lever, and by a single touch with the foot either of the following actions can be obtained.

1. The work-tray is lowered to a position near the bottom of the pot, and is then kept in continuous motion up and down below the surface of the melt.

2. The work-tray is raised right out of the melt, and held stationary above the melt. By a further single motion of the foot the work-tray alternately rises right out of the melt, and then lowers to the bottom, and continues so to operate until its action is changed by the foot control. This arrangement gives the decided advantage of the same movement for controlling all motions—that is, simple pressure of the foot lever.

The gas and air proportioning valve ensures perfect control of temperature and atmosphere. The gas and air is proportioned in true ratio to give the most efficient combustion, and at the same time the correct non-oxydizing atmosphere is maintained in the furnace chamber throughout the whole range of valve opening, which prolongs the life of the pot. The valve is operated by a single handle, which is in effect a " one-point " control, easily operated manually, and greatly facilitating the addition of automatic temperature control should such be required. A damper is connected with the gas and air proportioning valve, regulating the flue outlet in accordance with the gas consumption. This feature has proved very successful with the patent " Novopress " recuperative oven furnace. The correct functioning of the valve is dependent on the maintenance of a steady pressure in the gas and air supplies, and serious fluctuations are corrected by gas and air pressure governors.

Sheffield Gas Company.

The Sheffield Gas Company is exhibiting three types of gas-fired furnace which have a very wide field of application in the steel trades. Two of the furnaces are specially designed for the successful heat treatment of high-speed steel tools, and are essentially high-temperature furnaces. Each furnace has a preheating chamber and a high-temperature chamber, and both chambers are so designed as to guarantee uniform heating. The furnaces are particularly well insulated against loss of heat, and can be operated very economically.

A notable feature of these furnaces is that the temperature of the preheating chamber is under positive control, although being heated only by waste gases from the high-temperature chamber.

The third furnace is a gas-fired annealing or low-temperature heat-treatment furnace, and is designed to carry out annealing processes without the use of containers, and at the same time to prevent damage to the surface of the material being heated.

All these furnaces are designed to illustrate the application of the recently patented process of the Sheffield Gas Company for the heat treatment of steel without the formation of scale or decarburization.

In the two high-temperature furnaces tools made of special steels, such as high-speed steel, can be heated in such a manner that they require no grinding before being put into service. They are free from scale, and there is no decarburization, and even tools of the most intricate type can be successfully treated without any damage being done to the cutting edges. Moreover, the service of tools treated in these furnaces is considerably higher than the service of tools treated in any other form of furnace. The system of atmosphere control used is so simple that its cost is almost negligible.

Newcastle-upon-Tyne and Gateshead Gas Company.

The furnace exhibited has been designed with a view to fulfilling all the conditions imposed by modern heat-treatment methods. It is designed to meet the conditions arising out of both intermittent and continuous operation, and combines the advantages of rapid attainment of working temperature together with high efficiency over long and short periods of operation. Furnaces of this type bring full recuperative efficiency within the practical conditions required in the average heat-treatment shop at a reasonable first cost, and are capable of operating on natural draught over a working range up to 1200° C. with a uniform temperature to within 5° C. with a reducing atmosphere, thus meeting the exact requirements of high-grade heat treatment.

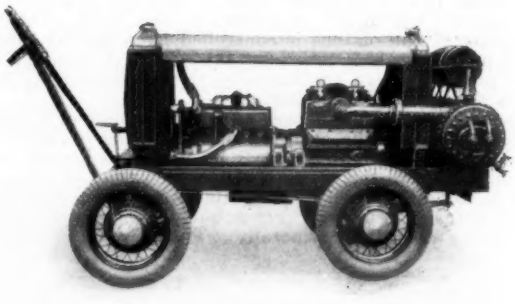
Lead Wool Company, Ltd.,

Snodland, Kent.

This Company are exhibiting pipe jointing materials, including " Lead Wool," lead wire, spun yarn, leaded yarn, bitumenized yarn, together with sample sectionalized joints. A pipe jointed with their patent flexible rubber ring joint is shown, together with caulking tools, both pneumatic and hand, various sizes of main stoppers, and a model patent joint testing apparatus for large pipe.

Of particular interest is a portable air compressor, most spare parts of which can be obtained from any Ford dealer throughout the world, together with a complement of pneumatic tools for mainlaying and road work generally. The particular model shown is mounted on pneumatic tyres and equipped with springs and brakes for towing.

1. Example of Leaded Yarn.



2. Lead Wool Company's Portable Air Compressor.

A joint compound for screwed and flanged pipes, suitable for gas, oil, petrol, and air, is also included in the exhibit.

Lighting Trades, Ltd., and the Welsbach Light Company, Ltd.,

Farringdon Street, London, E.C. 4.

A comprehensive range of modern lighting fittings, burners, and gas fires is shown on this stand. As in previous years the exhibit includes an actual demonstration of such important processes in the manufacture of incandescent gas mantles as knitting, ring-tying, pleating, sewing, burning off, and shaping. Specimens of the various types of mantles manufactured are displayed, the exhibits ranging from a mantle measuring approximately 9 in. high for lighthouse work, to one of about ¼ in. in height, used with the microscopic burner as a substitute for the ordinary night light.

A Bowl Fire by Lighting Trades, Ltd.

The general effect of the stand expresses the present trend of taste towards chromium gas fittings and those of the panel type, the examples of each kind displayed being representative of the wide and varied range which the Company can supply. The popular panel fittings which have hitherto been fitted with rimpled glass in various tints, are now displayed with the new " Prismolac " glass which enhances the lighting effect while retaining the former pleasant shades.

Various types of burners and lamps for domestic and outdoor use are also displayed. Special prominence is given to the portable Welsbach " Handiheater " and

"Kernscreen" fires. A new gas bowl fire and a new gas sign are other features.

A convenient cupboard for the airing or drying of clothes is a need in so many homes that great interest should centre round the new "Snowhite" clothes drying cabinet. This model is obtainable in four sizes, in all of which thermostatic control enables the heating to be adjusted either for airing only, or to the exact drying temperature required by any special material.

Donald Macpherson & Co., Ltd.,

Mitcham, Surrey.

An important recent development in the Gas Industry has been the introduction of heat-resisting stoving enamels suitable for use on all kinds of gas appliances, and in these developments "Foochow" oriental lacquer has taken a prominent part. By evolving a low-temperature stoving material capable of withstanding all ordinary usage temperatures, "Foochow" lacquer has opened up considerable possibilities in the economical treatment of gas fires and cookers in attractive and durable colours.

A wide range of these finishes are to be found on the "Foochow" stand, which is again a landmark in the Gas Section by reason of the brightly coloured "Foochow" pagoda, which forms a feature of the exhibit. Incidentally, the pagoda is finished in "Foochow" synthetic enamels, the latest "Foochow" contribution to decorative materials for offices, showrooms, &c.

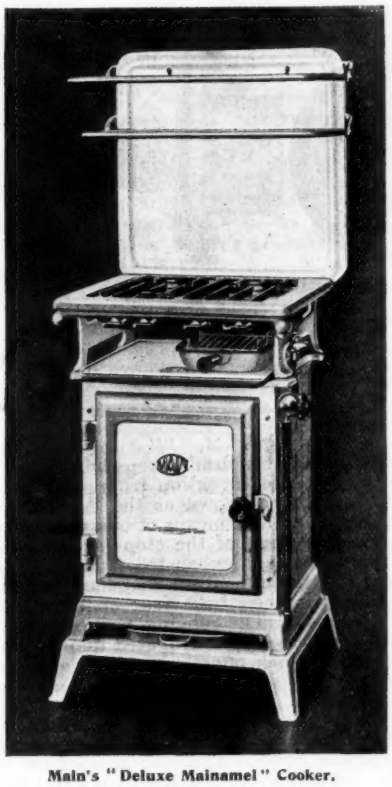
Other exhibits show the latest "Foochow" paints for waterless and other gasholders which have been evolved in collaboration with leading gas engineers and gasholder manufacturers. Also exhibited are "An-y-namel" meter paints and "Prima" for steelwork.

A particularly interesting feature of Messrs. Donald Macpherson's exhibits this year is a plant for demonstrating the uses and application of synthetic enamels, and many visitors will take advantage of the invitation to bring small articles with them to be finished under their own observation.

R. & A. Main, Ltd.,

Falkirk.

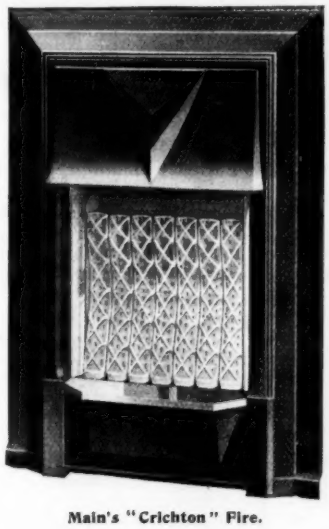
The gas cooking and heating appliances which this firm exhibit are indicative of the high standard achieved by constant research allied to modern methods of design and manufacture.



Main's "Deluxe Mainamel" Cooker.

Prominent among their cookers is the "Deluxe Mainamel" series shown in green and cream and blue and white. These cookers are fully enamelled—even to the back—and thus present to the user a high standard of beauty and hygiene. Efficiency and economy are assured by properly-designed burners and the patent "Conservor" oven which equalizes the heat and thus enables baking to be done on every shelf, with a resultant saving of gas. Automatic oven control is provided by the distinctive red-dial "Mainstat." Other cookers are shown in mottled and dappled enamel finishes, and in sizes suitable for all domestic and large-scale cooking requirements.

In the full range of gas fires exhibited, two distinctive designs may be seen. They are the "Gloria" and the "Crichton." The former is a notable departure in design which offers distinct possibilities in the decorative treatment of the fireplace. It can be inserted in a panel, either to an existing grate or in any place where a flue exists in the wall or where one can be provided.



Main's "Crichton" Fire.

In the "Crichton" fire the radiants are curved, and the angle of impingement of the flame on the various parts results in the top, middle, and bottom of the fire giving different appearances of heat. Like the "Gloria," it has a minimum projection from the grate or panel to which it is fitted.

The radiator section includes the "Unimain," which ensures a thoroughly efficient and comfortable system of heating by means of perfect combustion of the gas in properly-designed tubes. Its governor burners take care of any variation in local gas pressure, and its automatic control of the heat output prevents over-drying the air. The "Cinemain" radiator, for cinemas, &c., embodies the features of the "Unimain," but has a fixed front instead of a hinged door, thus preventing any unauthorized person from interfering with the burner or internal parts of the radiator base.

A novel design of wall radiator—the "Romain" panel heater—is also shown. This heater fixes on the wall and requires no flue. A special safety pattern, for garages and factories where highly-inflammable goods are manufactured or stored, is obtainable with safety locking tap and double gauzes in base and outlet.

The display of storage water heaters and geysers covers every normal requirement in the provision of hot water for kitchen sinks, cloakrooms, hair-dressing saloons, surgeries, bathrooms, &c.

Maxol Heaters, Ltd.,

54, Mytton Street, Manchester.

This firm are exhibiting various types of gas geysers for household and restaurant purposes, together with water boilers for canteens, &c. The firm's "Maxol" geyser provides an instantaneous supply of boiling or hot water in unlimited quantities. It embodies the broken water feed principle and is controlled by interlocking taps. The consumption is stated to be approximately 60 c.ft. per hour, and all the inside parts are made of strong copper, heavily tinned to keep the water pure for drinking.

Metropolitan Gas Meters, Ltd.,

Hyson Green, Nottingham.

This firm are showing a wide range of gas meters of the lights, standard, and high-capacity types, both prepayment and ordinary, and including stop action meters, hotel meters, and ration meters. The prepayment meters are of both the single-coin and the two-coin variety.

Midland Brass Fittings Company,

181, Aston Road, Birmingham.

The Midland Brass Fittings Company, catering for the distribution side of the Industry, show a complete range of their products, including gas fire cocks, maincocks, small brass fittings, pendants, brackets, and the now popular hot-pressings. The Company also demonstrate switch fittings, slot fittings, and various other novel devices.

Moler Products, Ltd.,

42, Kingsway, London, W.C. 2.

"Fosalsil" heat insulating products in all their various forms and grades are shown on this stand. Engineers are available to discuss the advantages that can be achieved on various types of plant by efficient insulation. A testing apparatus is in operation so that the thermal conductivity of different types of insulation may be compared.

During the past year or so a tremendous number of new uses has been found for "Fosalsil" No. 1 heat insulating aggregate, which is made up into exceptionally strong and very light-weight heat insulating concrete, particularly suitable for kiln bases, furnace doors, &c.

New Geysers, Ltd.,

Addington Square, London, S.E. 5.

This firm's exhibit embodies a full display of up-to-date geysers and water heaters, in numerous finishes and sizes, suitable for every requirement. Porcelain enamel finish for geysers was first introduced by this Company in 1925, and the final result of this experiment was the "White

The "White Ensign" Geyser.

Chief" geyser, which is of high efficiency and special construction embodying the patent sliding "Access" base. The firm have since introduced lower-priced patterns—the "White Ensign" and "Cadet." All their porcelain enamel geysers can be supplied in green, blue, pink, and cream, as well as white.

The new pattern "Reliafont" for multi-point supply is entirely automatic, and is available in numerous finishes, including porcelain enamel. The "Mite" geyser for scullery sinks or basins, or fitted with shower for hairdressing saloons, can also be supplied in porcelain enamel. The "Instor" water heater—combined geyser and storage—is a useful appliance for general household purposes.

George Orme & Co.,

Oldham.

On this stand is a comprehensive range of wet and dry gas meters, high-capacity meters, prepayment meters, and gas main cocks.

Parkinson & Cowan (Gas Meters), Ltd.,

Terminal House, Gosvenor Gardens, London, S.W.

Messrs. Parkinson & Cowan (Gas Meters), Ltd., have somewhat changed the nature of their exhibit this year. The stand is divided, as before, between the two branches, W. Parkinson & Co. and W. & B. Cowan, but it is closed in for the convenience of customers and for demonstration purposes. In order to enhance this accommodation there is no exhibition of heavy apparatus, such as governors and test gas holders, but these are shown upon the interior walls in attractive sectional drawings. Charts and brochures are provided, illustrating various developments in gas meter construction.

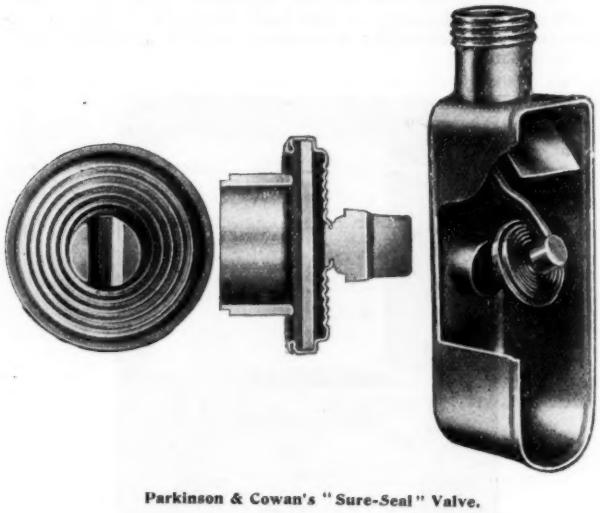
On the exterior of the walls in a series of alcoves, are displayed working models of the latest consumers' meters, with glass windows showing diaphragms and valve plates. These are backed by mirrors so that the models can be viewed from all angles.

These meters are fitted with the firm's new "Arc" slide valve. They claim that this design of valve plate offers exceptional facilities for large gas passages, direct and "stream line," so that there is a minimum absorption of pressure as gas passes through the meter. Charts are shown illustrating that these meters will pass their rated capacity with an absorption less than 2/10ths W.G.

Other models are shown of the older type of standard and high capacity meters, both of which have been brought up-to-date so as to yield their capacity with lower pressure absorption.

A new iron-case meter is presented as an instrument for easy repair. The meter is made up without the soldering iron in three case sections. The cast casing may be useful when meters are required for high pressure or in places where rough usage may be expected. Alternatively the casing can be made of aluminium-silicon alloy, the advantage of this being reduction in weight and saving in cost of transport and handling. All the above meters can be supplied as ordinary or prepayment, the latter being offered with the optional two-coin movement.

Following the above an entirely new device is offered, to be known as the two-part tariff mechanism. This is to be supplied as an annexe to the ordinary two-coin movement to be operated as follows. The meter is set to a certain price of gas which is intended to cover the rental of a slot installation spread over a minimum consumption. When this minimum has been reached, the mechanism automatically changes gear to a lower price representing the cost of gas only. Thus a gas undertaking is able to spread the hire of the installation evenly among all the prepayment consumers, and the larger consumer will no longer have to carry an unfair share of the burden.



Parkinson & Cowan's "Sure-Seal" Valve.

Applicable to all this firm's prepayment mechanisms is another new patented invention from which much is expected. This is to be known as the "Sure-Seal" valve. It has been invented as a means of overcoming the difficulties of accurate seating of the stop-valve which shuts off when the prepayment is exhausted, and it is claimed that a great many of the difficulties that have arisen with prepayment meters in their behaviour on the district can be overcome thereby. The moving portion of the valve is housed in a stainless steel corrugated diaphragm, attached to a metal hub, which offers sufficient elasticity of movement to correct any small divergence in the act of closing.

For places where condensation may be expected, a self-draining meter is provided, and this is attained by the simple and rather startling means of turning the ordinary dry meter upside down. Thus the liquor from all the four diaphragm compartments can drain out through the valves and away at the connections. This meter is fitted with special piston slide valves that can work in the inverted position. It is manufactured under licence from the patentees.

A very neat and strongly constructed little pressure gov-

ernor is exhibited for use with gas cookers or other appliances. It compensates for changes of inlet pressure through a considerale range, and for consumptions varying from a few cubic feet per hour up to 150. Thus it is really large enough to act as a service governor on small installations.

Parkinson Stove Company, Ltd.,

Stechford, Birmingham.

The Parkinson Stove Company's exhibit has always been a prominent feature of the Gas Section, and the Company's 1934 display is no exception to the rule. Among the novel features, one is introduced to " Mr. Parkins "—the new symbolic character of the Company, and it is expected to hear more of this gentleman who stands for outstanding efficiency.

Parkinson's "Minette" Cooker.

The many gas appliances on view are typical examples from the firm's range of cookers, fires, radiators, and water heaters, incorporating the latest improvements in design and attractive colour finishes. Ingenious display is used in featuring the new " Minette " cooker, and this smart little cooker is mechanically operated by a model of the modern housewife, demonstrating the ease of operation of the cover, and the clean and tidy appearance when closed. The Minette is also shown without the cover, but fitted with plate rack and splash plate.

A new addition to the well-known " Calthorpe " range is the No. 244 model with the table top. This cooker has been produced for those who favour the principle of the " Minette " but require a larger cooking space, and the enamel splash plate is designed to cover the hotplate when not in use, and its porcelain top gives added convenience as a table, suitable for making pastry, &c., upon. This model combines all the up-to-date features of the " Calthorpe " cooker.

The " Calthorpe " table cooker provides an exceptionally large cooking capacity for its size, and includes the standard two-burner oven, and a single oven which can be used for smaller cooking operations, or as a hot-closet. The large hotplate contains boiling burners, a simmering burner, and an adjustable grill.

The " Birma " cooker offers an ideal substitute for the black cooker. Designed with easily detachable enamelled door and side panels, maintenance and reconditioning are facilitated, and its moderate price enables gas undertakings to offer slot and other consumers an enamelled cooker of modern design. Various other Parkinson cookers are shown including the " Newpark " and " B " type, and many examples of artistic colour finishes are to be seen.

The Parkinson gas bowl, also exhibited, which obviates trouble due to liquid boiling over, was described in our issue of July 5 last (p. 34). Its enamel surface can be kept clean and hygienic and is a useful addition to the kitchen, nursery, or sick room.

In another section of this exhibit are shown examples of modern gas fires in attractive finishes. Several models of the " Curvex " fire are to be seen, this having been specially designed with curved radiants to secure a wide distribution of heat. The portable and screen fires are a new feature, and are of strong construction and easily carried about. The house planner and builder is fully catered for in the range of Parkinson built-in fires and mantel registers. The " Flatholme " fire, which has been specially designed for housing schemes, is an example of the flush fitting type of fire. The " Panno " and " Welwyn " fires, both of the panel type, are simple in design, but obviate the necessity of a hearth or curb, and in the attractive colour finish, plaque surrounds strike a modern note in up-to-date construction.

In the radiator and heater section a " Cabinette " heater is specially featured. On account of its limited height, this can be used under windows, &c., and is specially useful for hall or office heating. Of attractive design, it is supplied in three sizes and black or colour finishes.

Another section of the exhibit features water heating appliances. The " Treasure " geyser in chromite and colour

The Parkinson Gas Kettle.

finishes is exhibited, as also the smaller " Pearl " geyser, adapted for use in kitchens and lavatories. Examples of the " Gacylette," a small storage heater for domestic use is on view, including the " New Gacylette " in which the latest improvements have been incorporated. This model is supplied either lagged or unlagged, and its construction ensures that no condensation can occur in normal circumstances.

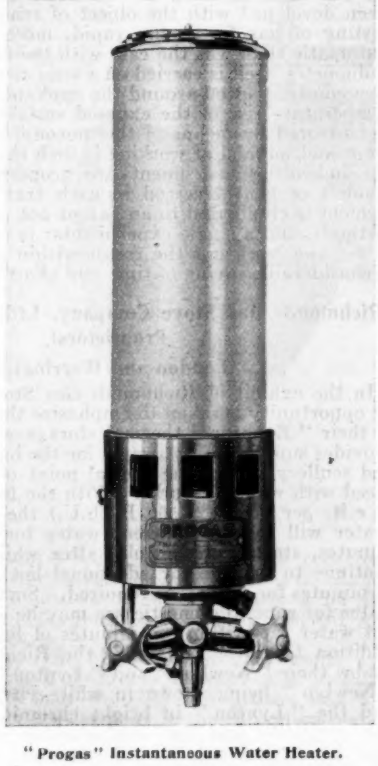
The Parkinson gas kettle is also shown, being a self-contained unit in which the flame is not exposed when pouring.

Some fine examples of modern advertising and window displays are exhibited on a photographic swivel leaf stand.

Progas Company, Ltd.,

95, Belgrave Road, Victoria, S.W. 1.

This firm features Progas instantaneous water heaters, which are made for single and multi-point purposes. One of their particular features is the non-luminous burners. Backfiring has been successfully overcome by the use of a special bunsen burner, and, by the elimination of the possibility of corrosion of the burners and sooting up of the inner cylinders, the efficiency of the heaters is most satisfactory, an efficiency of 80% being claimed. The gas is thermostatically controlled.



"Progas" Instantaneous Water Heater.

When the pilot is not alight, the thermostat closes the gas supply, which is further controlled by a safety device against scarcity of water.

Progas instantaneous water heaters are fitted with a water pressure governor to ensure a constant water flow and therefore a constant temperature. They are also de-

signed to prevent condensation, employing a special anti-condensation mantle.

Special care has been taken to facilitate dismantling, so that they can easily be cleaned of scale in hard water districts. Chemical cleaning is not necessary. They can be fixed direct to the main or to a cistern supply, and the installation to the existing water tap is made very simple by means of special connections. The heaters are supplied in white lacquer and in chromium plate.

W. Parkinson & Co.,

Iron Lane, Stechford, Birmingham.

Messrs. W. Parkinson's exhibit illustrates recent developments in gas equipment for street lighting—standard square pattern lanterns with self-contained inverted burners with outside gas and air adjustment, also fitted with upright swan-neck type burner; conversion burners (arranged in both cluster and alignment formation), metallized to prevent corrosion; also suspension and " U " fixing lamps, embodying the latest improvements including reflecting devices.

Interest, however, centres on the Parkinson lanterns fitted with the latest reflecting devices, including adjustable " Staybrite " steel curved-top reflectors which, used in conjunction with the well-known " Mor-Lite " patent directional reflectors, show a marked advance in directional lighting. The combination of curved-top and " Mor-Lite " reflectors results in a considerable increase in candle-power in the direction where it can be most usefully applied.

Examples of the Parkinson traffic lamps are on view, including danger lamps for traffic island positions and lamps for illuminating traffic signs, one of which is a double purpose lamp as it can also be used as a danger signal.

Lighting engineers will be interested in the Parkinson Lamp Selection Chart, which shows at a glance the lighting unit for any ordinary B.S.I. classification.

Radiation Ltd.,

London and Birmingham.

The Radiation stand is, as usual, representative of the high traditions of design and construction applied to the manufacture of gas-heated appliances for domestic use. Among the various models exhibited by the associated manufacturers (described separately), the range of colours available and the excellence of the finishes themselves deserve special mention.

A most interesting exhibit, and one that will be of peculiar interest to technical men visiting the Fair, is the Radiation integrating radiometer. This instrument has been developed with the object of rendering the efficiency testing of gas fires more rapid, more precise, and more automatic than was the case with the older methods. The radiometer itself is carried on a semi-circular arc and moves at a constant speed around the appliance to be tested. The temperature rise of the exposed surface of the radiometer is measured by means of thermocouples, and the arrangement and method of working is such that the deflections of the indicating instrument are proportional to the total amount of heat received in each transit. The personal element is eliminated to an extent not possible in the older methods, and a single experimenter is enabled to complete a test and work out the result within about half-an-hour. A considerable saving of time and effort is thereby effected.

Richmonds Gas Stove Company, Ltd. (Radiation Ltd., Proprietors),

London and Warrington.

In the exhibit of Richmonds Gas Stove Company, Ltd., an opportunity is taken to emphasize the excellent features of their " Equator " thermal storage water heater, which provides supplies of hot water for the bath, lavatory basin, and scullery sink. The special point of this heater is the speed with which it works. With the full-on gas supply of 55 c.ft. per hour (27,500 B.Th.U.) the 12-gallon capacity heater will supply sufficient water for a hot bath in 45 minutes, starting from cold, after which this heater will continue to provide for additional hot baths about every 30 minutes for as long as required. Small quantities of hot water for general domestic use may be drawn off from any hot water tap within ten minutes of lighting the gas. In addition to the " Equator," the Richmonds' exhibit includes their " Newlyn " and " Lynton " sink heaters, the " Newlyn " being shown in white vitreous enamel finish and the " Lynton " in bright chromium-plate. So that the simplicity and fine workmanship of these appliances may be appreciated, these heaters are shown in sections. There is also a section of one of Richmonds' " Don " geysers.

Another interesting feature, prominent among the Richmond appliances, is their new " Lynmere " heater which is a development of the " Newlyn " referred to above. In addition to providing hot water at the scullery sink, this heater can also be connected to the bath and wash-basin. In normal use the water in the heating unit is shut off from the storage by means of a hand-operated valve. When this valve is closed the heating unit alone gives hot water for use at the scullery sink only. When hot water for a bath is needed the valve is opened and this at once brings the reserve storage into circulation increasing the capacity of the heater from 2 gallons to 12 gallons. The " Lynmere " is a specially designed low-consumption heater for use in houses or flats in which there is no hot water system.

Richmonds' "Newlyn" Sink Water Heater.

Richmonds' "Equator" Storage Water Heater.

Particular attention will be directed to Richmonds interpretation of the Radiation standard High " Beam " gas fire. An excellent design has been produced called the " Flambeau " which is a very happy contribution to the new gas fire technique introduced by this novel fire.

R. Russell & Sons, Ltd.,

Peel Foundry, Derby.

This firm are exhibiting a selection of their " New Herald " gas cookers and gas combinations in vitreous enamel finish of various colours.

The " New Herald " gas combination offers a most advanced method of combined domestic heating, cooking, and hot water supply. It consists of a highly efficient gas oven, thermostatically controlled, having one bottom burner at the back, and long hotplate with three boiling burners and griller placed in a row to obviate " reaching over; " a seven-radiant gas fire of the most approved design; and last, but not least, a patented gas-heated circulating boiler, thermostatically controlled, suitable for working a hot water cylinder up to 30 gallons capacity, for supplying all the domestic hot water requirements.

These appliances are all combined in one compact unit of pleasing design, each appliance being governed by a separate tap; this is specially useful during hot weather as the water system can be heated without appreciably raising the temperature of the room.

Sawer & Purves,

Miles Platting, Manchester.

Exhibited on this stand are consumers' meters in glass and tinplate cases, also various sizes of meters and meter

parts. This firm's prepayment meter with two-coin attachment is shown, as is also their patent diaphragm. This diaphragm, which is now widely used, has a covering of oiled silk, enabling the leather to retain the lubricating oils, preventing the " drying-up " of the leather, and prolonging the life of the diaphragm. A model coin collecting van is shown which, it is claimed, is a boon to slot meter collectors. Pressure gauges, main taps, and brasswork of all kinds made by the firm are demonstrated, as is also a model test holder.

Sigma Instrument Company,

Letchworth.

A new instrument exhibited on this stand is the Sigma specific gravity recorder, which measures the buoyancy of a column of gas 6 ft. high by 10 in. diameter (1,830 mm. by 254 mm). The vacuum at the foot of the column acts on an oil sealed bell suspended from a weighted balance arm supported on knife edges. The motion is magnified and recorded. A small flow of gas maintains a fresh sample in the gas column.

The clock runs for 14 days, and the standard chart lasts for 14 days, but longer period charts are obtainable. The standard range of ruling of the chart is for specific gravity from 0·4 to 0·65. The recorder is sensitive and robust, and is suitable for use in the retort house, the exhauster house, or the laboratory.

This firm are also showing recording and indicating calorimeters and pressure gauges; a relay valve for use in connection with automatic control of calorific value; and automatically-operated lamp which indicates when the calorific value is above or below the desired working range.

Sofono Ltd.,

Purley Way, Croydon, Surrey.

This firm exhibit their " Southern " coke fire, which has been specially designed to burn ordinary coke and is ignited by a gas burner. It is stated by the makers that a glowing fire with a flame on top can be obtained in about three-quarters of an hour and that the fire will then burn without requiring attention for three or four hours. The grate is finished in chromium plate and vitreous enamel, while the poker and ash-pan lifter are also chromium plated. When once fitted the grate is perfectly rigid, while owing to its convenient construction it can be taken to pieces and assembled in less than a minute, which greatly facilitates cleaning of burners, &c.

Stanton Ironworks Company, Ltd.,

Near Nottingham.

A striking feature of the Stanton Company's stand is a machine designed to demonstrate the suitability of the Stanton-Wilson self-adjusting joint for withstanding vibration under the worst possible conditions to which a pipe main may be subjected, such as arise when a pipe is supported for only a portion of its length. Two Stanton-Delavaud spun iron pipes, coupled with the Stanton-Wilson joint, are supported at their outer ends by pivots and at the centre by springs. An electrically-operated vibrator is attached to the centre of the pipes, which are thereby rapidly vibrated. A pressure of 50 lbs. per sq. in. air is maintained within the pipes, and is indicated by gauges attached.

A second machine demonstrates the leak-tightness of the Stanton-Wilson joint when deflected under pressure.

Also shown is a 6-yd. Stanton-Delavaud spun iron pipe. The reduction in the number of joints effected by the use of this long pipe enables a considerable saving to be made in laying costs.

For the first time the Company are exhibiting their new special 3-in. diameter Delavaud spun iron pipe, which is ¼-in. thick, weighs 1 cwt. per 12 ft. length, and is being sold at a reduced price. This pipe is not intended to replace the standard thicker 3-in. spun iron pipe, but has been introduced in the expectation that it will appeal to a greatly extended market. The full range of Stanton-Delavaud spun iron pipes, in 3, 4, 5, and 6 yd. lengths, are represented on the stand. In the Delavaud system, pipes are cast in cylindrical steel moulds, and in manufacture the metal is held against the sides of the mould by centrifugal force, thus eliminating sand cores, except for the small core which forms the inside of the socket.

The floor of the Stanton Company's stand is paved with cast-iron road sections of the type which the Company have supplied for the 3-mile stretch of iron road in the new Mersey Tunnel. These sections are 1⅞ in. deep, with ribbed undersides, and diamond-shaped studs on their upper faces ensure that the cast-iron surface will remain non-skid in all weathers. The studs are provided with a hardened upper layer which greatly increases their resistance to wear. A lighter type of section is available for indoor use in garages, factories, dairies, breweries, bakeries, and in all cases where a hard-wearing surface is required.

Stourbridge Refractories Company, Ltd.,

Shut End Works, Pensnett.

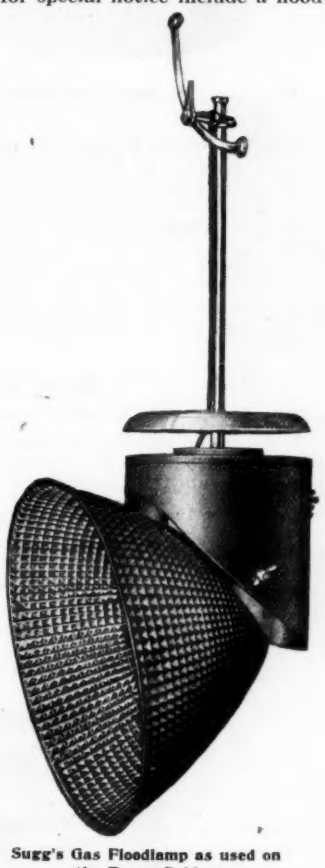
This firm show their " SRCo " brand fireclay reinforced with silica and grog, which is generally used in positions where fireclay is required to stand long, continuous heating without shrinking; it conforms to Gas Engineers' Specification No. 1. The " B " brand is a fireclay of the usual Stourbridge type, but passing Grade 1 Specification. It is reinforced with well-burnt selected fireclay grog, and is suitable for positions where the temperature changes are frequent—viz., the extreme ends of the tops and bottoms of retorts, water gas generators, regenerator settings, and coke oven plants.

The " PL " brand is a very dense straight clay brick highly reinforced with special fireclay, and is utilized for the lining of producers. Refractory insulating bricks are shown, these being of fireclay, about 55% porosity, but capable of withstanding temperature equal to Grade 2 Specification. Examples of the firm's jointing cement are also shown.

William Sugg & Co., Ltd.,

Ranelagh Works, Chapter Street, Westminster.

Of a host of appliances for lighting, heating and cooking by gas, items which call for special notice include a floodlamp, with cluster of 6 No. 2 mantles and special reflector designed by the South Metropolitan Gas Company, which is a replica of the six lamps used so successfully to light the bascules of Tower Bridge. We illustrate this fitting, which should be of particular interest in cases where powerful, concentrated lighting is called for, and this without the source of it being too much in evidence. Another item which will receive considerable attention, though of quite a different character, is the gas-heated " Waffler " of which a photograph is here reproduced. This handy little appliance is in polished brass with matt aluminium moulds and polished wooden handles.



Sugg's Gas Floodlamp as used on the Tower Bridge.

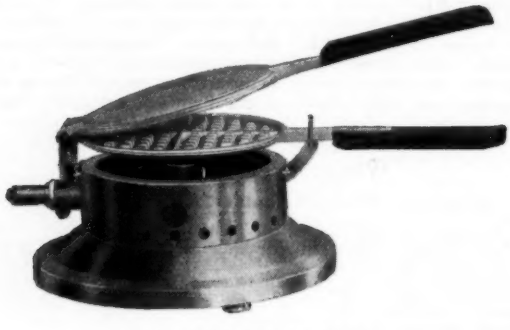
Another novelty is the safety gas garage heater, which is provided with Davy gauze, rendering it perfectly safe in spite of the proximity of petrol fumes.

Also exhibited is the series of lamps and fittings for surgical, clinical, and dental work; very powerful reflectors render these fittings highly efficient, and there is no chance of their failing at a critical moment. Touching on the subject of health and hygiene, too, a very efficient gas incinerator is on view.

The introduction of the ultra-modern shop fronts and interiors in rustless-steel, chromium plate, or other metallic effects has called for new shop-lighting fittings and undoubtedly there is perfect harmony in the chromium plated " Littleton " lamp with octagonal " Resistopal " globe, for the exterior and the similarly finished and globed " Streatham " pendant for the interior of the shop.

Visitors concerned with public lighting may see examples of the lamps which are being supplied under the big City of Westminster contract, the Borough of Paddington scheme,

and for the lighting of Chelsea Embankment. The "Rochester" lamp in both its upright and suspension forms is, of course, in evidence here. A novelty in this connection is the new three-or-four-way Multi-Ray reflector, which is adjustable for road-bends, T junctions and cross roads. A working exhibit in connection with public lighting is to be seen in the new road at the north side of the Fair, passing the car parks, the first three hundred yards or so being lighted by gas. The installation consists of concrete columns, surmounted by special two-way fitments supplied by Messrs. Sugg, which carry ten-light lamps—many of them being "Rochester" lamps—the whole of the seventy-six lamps employed being fitted with distant control. All the erection work has been undertaken by the Birmingham Corporation Gas Department. The columns are supplied by Concrete Utilities, Ltd., for whom Messrs. Sugg are sole selling agents for these columns as applied to gas installations.



Sugg's Gas-Heated "Waffler."

Lighting by gas through the medium of ceiling fittings is rapidly growing in favour because of its great value for ventilating purposes. A novel fitting of this character has a very large white enamelled reflector, which fits close to the ceiling, a white enamelled outlet shaft, and large opal bowl.

The exhibit also includes examples of the "Red Sphinx" gas fires—with the unique incurved fuel formation—in numerous attractive finishes, and also specimens of Messrs. Sugg's cooking apparatus, including the popular "Eton" cooker.

Stoves, Ltd.,
Rainhill, Liverpool.

A number of interesting items are exhibited by this firm, who are introducing several novel features in design and construction of their appliances.

Stoves' "Bakerloo" Cooker.

On the cooking side, the "Bakerloo" is shown in a range of four models. An entirely new enamel finish has been introduced on these cookers—in appearance not unlike a fern leaf, and this will be marketed under the name of "Superl" enamel. This finish is exceedingly attractive and breaks away from the ordinary mottled finish. It is made in two colours—namely, green and brown. "Bakerloo" cookers are also finished in black and cream. A smaller cooker is the "Kitchenette," which embodies all the features of the ordinary sized cooker and is yet of dimensions suitable for flats or small families.

In regard to this firm's cookers, particular attention is directed to the reversible grill with central draught burner, the advantage of which is that the circular griller is remarkably efficient, while in the reversed position a full-size boiling burner is obtained. Thus, with this reversible grill burner, even a comparatively small cooker has available, if required, four boiling burners—an asset which should prove very useful.

"Supervector" Radiator by Stoves, Ltd.

An entirely new exhibit this year is Messrs. Stoves' "Supervector" radiator, which is of the panel type and suitable for halls, corridors, restaurants, offices, &c. The design of this appliance causes the heat generated by the luminous burners to ascend into a chamber, which is closed at the top, and thence to pass right through the heater to the outlet nozzle at the base at the back. If it is not convenient or desired to carry the heat away through a flue the rear outlet nozzle can be covered, and the heat returns upwards again between the inner and outer casing and escapes through gauze-covered apertures at each side of the top at the opposite side to that at which the cold air was introduced.

Another innovation by this firm is the "Wizard" bathroom bowl heater. There should be a popular field for an appliance of this kind, for it is fixed on a wall bracket with a double swivel so that the heat may be directed in any direction, thus efficiently heating the room without encumbering the floor. Another obvious application for this heater is in the nursery, where it may be set well up on the wall beyond the reach of inquisitive fingers, yet with the heat so directed downwards as to provide pleasant warmth for the occupants of the room.

The firm's "Silo" gas fire lighter has been greatly improved, and is now operated simply by the turning of a button once the main tap is turned on. There is no by-pass except just at the moment of ignition, and the operation is certain and instantaneous. This device should make a very wide appeal to the public when more generally introduced by gas undertakings.

A. G. Sutherland, Ltd.,

Warwick Road, Greet, Birmingham.

The exhibits of this firm embody the latest developments in the manufacture of dry gas meters. The main feature is a new type of radial valve of special design which has only two bearings and which reduces loss of pressure to a minimum.

Prepayment meters are also shown fitted with the "A.G.S." optional attachment, which, however, can be fixed for use with either pennies or shillings. The attachment is substantially built.

In addition, there is a full range of all types of standard high-capacity and small high-capacity meters.

Sutherland Meter Company, Ltd.,

Electric Avenue, Witton, Birmingham,

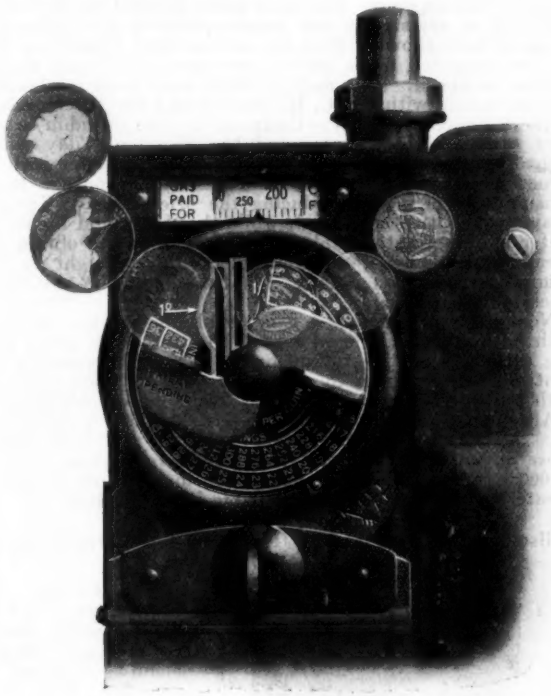
and

Willey & Co., Ltd.,

Exeter.

This is an interesting exhibit, displaying the products of the Associated firms of Sutherland Meter Company, Ltd., and Willey & Co., Ltd.

It includes a complete set of testing apparatus comprising the new Willey holders and mechanical devices to demonstrate the synchronization of the prepaid and registering mechanism of prepayment meters. Another exhibit—a specially constructed panel—shows the whole prepayment operation in sequence.



The "Du-Slot" Meter.

By manipulating a coin (penny or shilling) in the attachment the valve is seen to open and a light appears to show the gap, the amount prepaid is then registered as by the working meter, and the valve is seen to close and the light changes colour.

Complete ranges of the new small high-capacity meter sizes are on view, and the latest design of gas fire meter and cabinet fitted to gas fires. Brasswork for all purposes, also hot pressings for gas and water cocks and fittings, and meter parts are displayed, together with photographs of the wide range of engineering works carried out by the firm.

Timmis & Co., Ltd.,

River Stour Works, Stourbridge.

This firm are showing a 9-ft. section of a vertical retort built up in the modern zoning method out of what they consider the proper material for building such retorts—*i.e.*, in this case with a retort of the Glover-West pattern, the top is composed of 32% alumina material; the next quarter down of 42% alumina material; below that a zone built of a material ("Rayax") containing 60% alumina and very refractory and non-spalling, and below that again a zone of 42% alumina ("Lava") material. They are also showing two sections of a horizontal retort furnace arch with the retort itself on top of it, made out of segments of "Lava" 42% alumina material. This is a non-expanding cone 35 refractory which complies very easily with all the specifications, both Continental and American as well as English, for retort materials.

They are also exhibiting a selection of "Dome" insulating bricks and other articles made out of the aforementioned grades of products.

Tubes, Ltd.,

Birmingham.

Messrs. Tubes, Ltd., who have for many years specialized in cold-drawn seamless steel tubes made in all sizes from ¼ in. to 15 in. internal diameter, are showing a full range of their products in both straight carbon and alloy steels.

The firm are manufacturers of cold-drawn Admiralty boiler tubes, locomotive boiler and smoke tubes, high-pressure cold-drawn steam pipes, special corrosion-resisting "Resistco" tubes, alloy steel tubes for the chemical industries, cold-drawn oil cracking tubes in straight carbon and alloy steels, tapered and swaged tubes for the motor industry, and bush tubing, cold-drawn tubes for hydraulic lifts for the superheater and other tubes in special heat-resisting "J" steel.

Turners Asbestos Cement Company

(Branch of Turner & Newall, Ltd.),

Trafford Park, Manchester.

Little more than twenty-five years ago the virtues of asbestos were almost unknown from the commercial point of view. To-day there is a great industry devoted to the manufacture of asbestos and asbestos-cement goods for a multitude of purposes and trades.

Messrs. Turners Asbestos Cement Company, Branch of Turner & Newall, Ltd., provide evidence of the growth of one branch of the industry. Their products embrace many materials of interest to architects and builders.

"Everite" asbestos-cement pressure pipes for water and gas mains are suitable for all types of pipe lines. They are light, strong, non-corrosive, free from incrustation and electrolytic action, and are infinitely durable. "Everite" asbestos-cement flue goods, designed to suit the needs of gas engineers and gas salesmen, are supplied in an extremely wide range of shapes and sizes. The nature of the material, its insulating qualities, its freedom from condensation, and its light weight are all points in favour of its extended use.

An interesting development is that of "Everite" asbestos-cement ducts for ventilating purposes. These are being used extensively in chemical works, in commercial and university laboratories, as well as in many important buildings where ventilation has been given full consideration. "Everite" asbestos-cement ventilators have been designed to provide adequate ventilation and, at the same time, to withstand the attacks of the elements. They are suitable for all types of buildings.

For interior work "Turnall" glazed panels offer many advantages. They have a highly glazed finish which is exceedingly hard, non-brittle, and remarkably resistant to moisture and heat. Very many beautiful colours are obtainable. "Turnall" asbestos reinforced aluminium foil provides an efficient low-priced insulating material which is at once light in weight, convenient to handle and apply, and infinitely durable in performance.

Vulcan Stove Company, Ltd.,

Exeter.

The Vulcan Stove Company's exhibit of gas fires and cookers includes examples of the latter fitted with the Vulcan patent glass door panel. The construction of this glass panel eliminates steaming over of the glass or any loss of heat, and the "Armourplate" glass which is employed is practically unbreakable. The cookers are in a variety of attractive porcelain enamelled finishes, both mottled and plain.

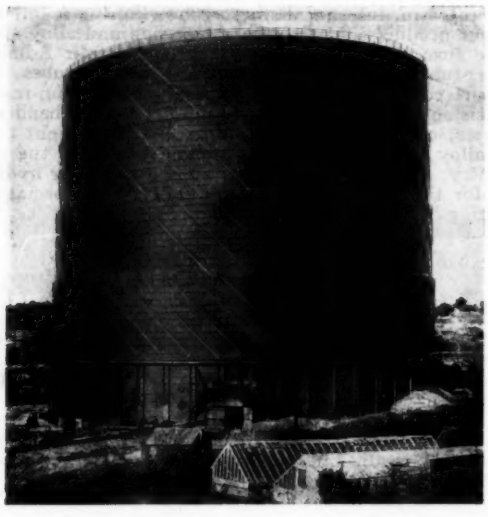
In addition to the ordinary type of gas fires, the Vulcan "Gip Fire Units" are also shown. "Gip Fire Units" consist of gas fire and slate slab surround and are supplied both as wall panel units and also as surrounds and hearth-plate units. They are available in over forty different colourings, including imitation wood and marble finishes.

C. & W. Walker, Ltd.,

Midland Ironworks, Donnington.

This firm's exhibit includes photographs of gasholders—spherical and cylindrical high-pressure, guide framed, and spirally guided, also the waterless Klönne gasholder;

purifiers, gas condensers, washers, washer-scrubbers, &c. They are also exhibiting a full-size model of a portion of the seal between the piston and the cylinder or mantle plate of the Klönne gasholder, a type of holder that has met with a great deal of success, especially on the Continent, though there are also a few examples in the British Isles. It has the advantage that no tar sealing liquid is required, neither pumps nor motors. The gas-tight joint between the piston and the mantle plate is made from specially prepared fabric which forms a species of piston ring and is pressed up against the sides of the mantle by means of bell crank levers with adjustable weights. The cylinder, or mantle, has a perfectly smooth surface, and is lubricated in a simple way.



4-Lift Spiral-Guided Holder by C. & W. Walker, Ltd., at Bournemouth

[Capacity, 5 million c.ft., shown fully inflated.]

Also shown is a two-roller carriage for spirally-guided holders of the self-lubricating type which has proved eminently successful over a number of years on gasholders of this type ranging from 5 million c.ft. capacity downwards. They are also exhibiting a form of jointing between the gas purifier cover and top, which has many outstanding qualities, the special indiarubber section being held throughout its length by grooved strips on each side, thus preventing " festooning " when the cover is removed from the purifier after probably many months of service. This type of jointing ensures direct metal to rubber contact between the cover and the top of the purifier, there being no intermediate metal whatsoever.

Photographs of high-pressure gasholders, spherical and cylindrical (vertical and horizontal), from pressures ranging from, say, 25 lbs. per sq. in. upwards, are exhibited. Also shown is a 15-in. " Audco " patent lubricated disc valve for gas-works, in which the rotating disc is always in contact with machined faces inside the valve, no matter whether the valve is open or closed. Among other things exhibited are models of some of the firm's well-known gas-works plant, and also a full-size purifier grid constructed on improved lines.

Walker, Crosweller, & Co., Ltd.,

20, Queen Elizabeth Street, London, S.E. 1.

The well-known sensitive recorders, for recording the " pull " by exhausters on vertical retorts, are shown on this stand as well as ordinary pressure recorders for use on district pressures and vacuum recorders for chimney draught, &c. A mercury filled pressure recorder is also shown, and this is typical of a compact and accurate high-pressure instrument. Two-pen recorders for recording gas and air reversal valve operation on open hearth steel furnaces are to be seen as well as a 3-pen pressure recorder.

Arkon gas and air flow recorders are now available equipped with electrical remote indicators, electrical remote recorders and/or electrical integrators. The standard low-pressure flow recorder both with and without mechanical indicator dial is shown, as well as the high-pressure recorder for measuring air and gas flows and purifier sections. A complete set of standard water-filled full-scale gauges are exhibited. These are more handy for taking off quick readings than are the U-tube gauge, and they are available if required with a non-freezing oil filling for use out-of-doors. Single-column gauges mounted in batteries on iron frames with large enamelled iron scales are also to be seen.

Waterless Gasholder Company, Ltd.,

13, Rood Lane, London, E.C. 3.

The Waterless Gasholder Company, Ltd., with associated firms of Licensed Contractors—R. & J. Dempster, Ltd., of Manchester; Robert Dempster & Sons, Ltd., of Elland; Clayton, Son, & Co., Ltd., of Leeds, and E. Cockey & Sons, Ltd., of Frome—are displaying a scale-model of the waterless (M.A.N.) gasholder. There are also exhibited a full-size section of the tar seal, which may be examined in detail, and a comprehensive range of constructional drawings, and a large selection of photographs showing British waterless gasholder contracts in various progress stages.

It may be mentioned that in Great Britain and elsewhere, the British Licensed Contractors above-mentioned have completed 38 waterless (M.A.N.) holders, in units ranging from 100,000 to 8,000,000 c.ft., and representing total storage capacity of more than 86,000,000 c.ft. Throughout the world no fewer than 250 waterless holders of the M.A.N. type are in operation. These include the world's greatest gasholder (20,000,000 c.ft.), as well as the largest in Europe (12,250,000 c.ft.).

George Wilson (Gas Meters), Ltd.,

Foleshill Road, Coventry.

One of the interesting features of this stand is that it is designed and built by the staff of Messrs. George Wilson. This Company relies entirely upon its own ideas for the appearance and layout of the stand, and built it in their own works at Coventry.

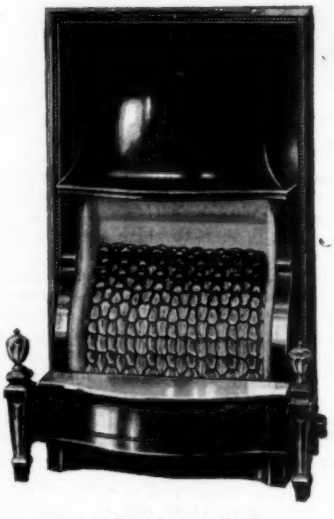
As usual, Messrs. Wilson have a very interesting array of gas meters on view. One large meter badged for 400 c.ft. per hour is registering the consumption of an ordinary by-pass, thus showing that no matter what quantities of gas are expected to be passed accurate registration need not be sacrificed. Two meters which have been produced in conjunction with Mr. C. H. Chester and the Directorate of the Swindon United Gas Company are the Swindon two-part tariff ordinary meter and the Swindon " day and night " meter. This two-part tariff ordinary meter is designed for those authorities who wish to encourage the consumption of gas by reducing the price of gas after a quantity has been consumed, while the " day and night " meter is designed to enable large users of gas to obtain a cheaper rate during those hours of the day or night when general consumption is low. For this meter the two-dial clock is incorporated.

New pattern two-coin (or optional) meters are shown with both open and closed tops. The closed top meter is one without a centre stuffing box in which the valves are controlled direct from the leathers. One of these meters with the working parts exposed is available for inspection.

Although this year, large meters are not exhibited, Messrs. Wilson have been very much in the field with these during the past year, and meters registering up to 10,000 c.ft. have been supplied, while instruments of even greater capacity are always available from this firm.

Wilsons & Mathiesons, Ltd. (Radiation Ltd., Proprietors),

Leeds and London.



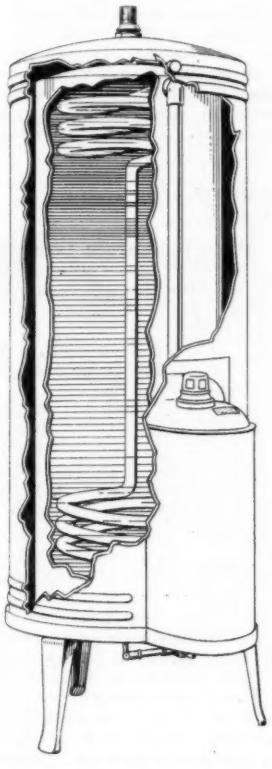
Wilsons' " Sunbeam " " Major " Gas Fire.

Wilsons & Mathiesons, Ltd., are featuring their popular " Sunbeam " " Major " gas fire with its curved fire front and delightful appearance of a glowing coal fire. The models shown are a representative range of the available designs, and in particular the " Dogs " are proving a very salable asset to the more ornate models.

The " Carlton " " New World " cooker No. 88 is shown in " Beau " finish, the colours being pale green and white, with bright chromium-plated fittings. There is also the Wilson High " Beam " gas fire, offering yet another variation in design of this remarkable new fire for which so much has been predicted.

John Wright & Co., Ltd. (Radiation Ltd., Proprietors),
Birmingham and London.

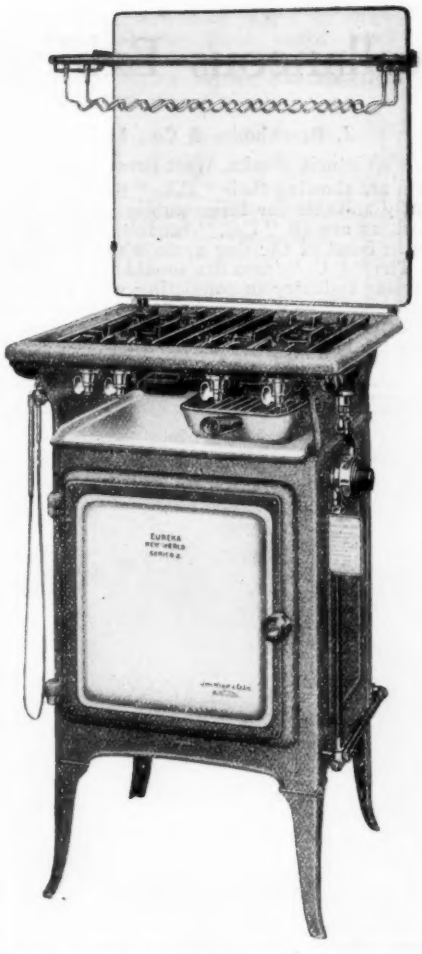
John Wright & Co., Ltd., have again concentrated particular attention on their water heaters, examples of the "Sunhot," the "Sun," the "K.C.U." and the "B.T.U." being provided, each in a beautiful finish.



Wright's N.C. "Sunhot" Storage Water Heater.

The mineral deposits when heating hard water have been effectively overcome with the "Sunhot" storage water heater, and much interest will be taken by visitors from hard water districts in the calorifier type of "Sunhot" specially designed for service in such areas. In this "Sunhot" mineral residue is reduced to a negligible minimum. In the "Sunhot" (calorifier type) the heat is transmitted to the water in the storage cylinder through a calorifier coil of large surface area, designed to ensure a rapid and efficient transfer of heat. The water passing through the heating unit circulates in a closed system, and no further residue occurs after the possible slight deposit during the first heating. The "Sunhot" (calorifier type) is made in 10 c.ft. per hour and 25 c.ft. per hour sizes.

The "Console" gas-heated radiator shown is very beautifully finished in a moorland green tone. The pleasing design of this radiator strikes a new note in this type of appliance. John Wright's exhibit is completed with a section of the "Sunhot" water heater and a 9-radiant "Vanitie" High "Beam" gas fire.



Wright's "Eureka" "New World" No. 325 Series Cooker.

Lighting and Heating at the Fair.

A commencement has been made this year on a portion of the road on the Aerodrome side of the British Industries Fair at Castle Bromwich, which will eventually run right round the Fair connecting up the other existing roads.

Three hundred yards of the road has been laid this year and this has been lighted by low-pressure gas lamps. The arrangements for the lighting have been made through the instrumentality of the Gas Industry Section Committee. Thirty-eight columns will be erected each carrying two low-pressure lamps of approximately 1,000 candlepower. The average distance between the columns, which are placed opposite each other on both sides of the road, is about 60 ft.

The columns have been supplied by Concrete Utilities, Ltd., and the lamps by W. Sugg & Co., Ltd., W. Parkinson & Co., C. H. Kempton, Ltd., and Falk, Stadelmann, Ltd.

The illuminations on the road will come well within Class "A" Specification.

During the two weeks of the Fair 7 million c.ft. of gas will be consumed in the Fair Buildings at Castle Bromwich, and there have been fitted 130 cookers, roasters, and hotplates, 200 gas fires and radiators, 140 water heaters, countless high and low pressure gas lights, as well as supplies for a great variety of heating purposes on over 100 individual stands.

* * *

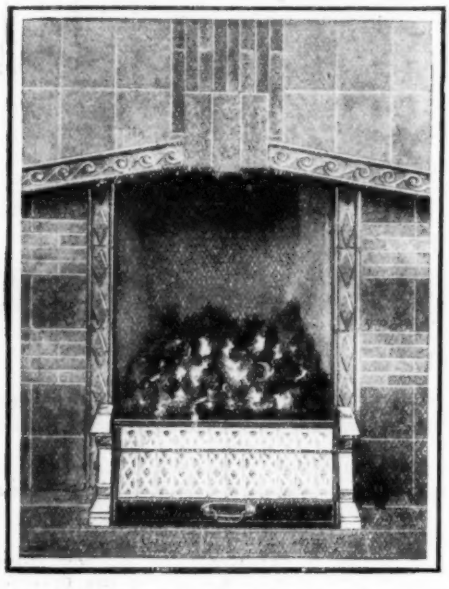
A serious problem which will face many exhibitors at the Fair will be the question of granting credit terms to customers from overseas. However well recommended an importer may be, there is always a possibility of his defaulting and thus involving the exporter in loss. The seller's safeguard lies in insurance. To assist exporters in dealing with this vital question, the Export Credits Guarantee Department of the Board of Trade are again providing inquiry offices at both sections of the Fair: At Olympia, Stand No. A. 2; At Castle Bromwich, Stand No. C. 1,035.

Miscellaneous Exhibits of Interest to Our Readers

J. Brockhouse & Co., Ltd.,

Victoria Works, West Bromwich.

This firm are showing their " C.C. " fire dog grate, which is eminently suitable for large public rooms. The fire is gas ignited, as are all " C.C. " models, and, also, there is a gas fire in front of the dog grate which is always ready for use. The " C.C. " inset fire should be particularly useful to the Gas Industry in competing with electric fires in hotel bedrooms. The gas fire is adequate for normal usage, but should the room be wanted as a sitting room, the open fire can always be lit.



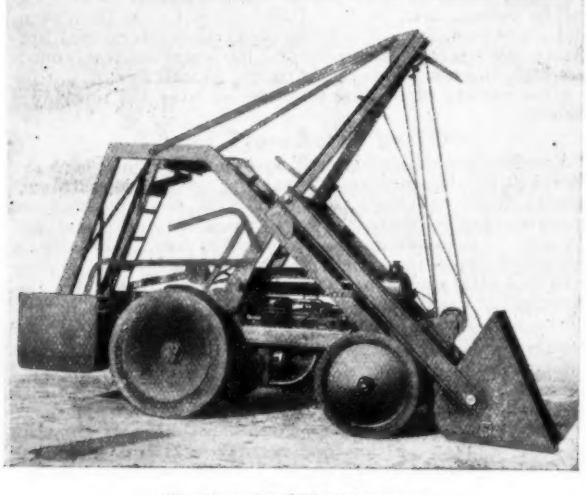
Model K "C.C." Fire Setting, Showing the Radiants.

Not only has there been an advance in the design of this firm's products, but also in the technical construction; and the makers guarantee for three years the heat-resisting steel grate bottom, which is now supplied as standard fitting on all their fires.

Chaseside Engineering Company,

Enfield.

The main item of interest in this exhibit is the Chaseside " Hi-Lift " shovel model A. There are two types of this



The Chaseside " Hi-Lift " Shovel.

machine, the main differences being the alternatives of solid or pneumatic tyres and the provision of a ¾ cub. yd. or ½ cub. yd. scoop. The machine will shovel from the ground and load up to 9 ft. high such materials as coal, stiff tarmacadam, quarried stone, gravel, sand, loose chemicals, metal scrap, and so forth. It is easily manœuvrable, and can travel at 10 m.p.h. It will handle economically from 5 to 40 tons of material an hour at a cost which, including depreciation and driver's wage, averages something like 1½d. per ton. It is foolproof and very sturdily built.

Carron Company,

Carron, Stirlingshire.

In the selection of products which the Carron Company display, some space is devoted to their gas cooking and heating appliances. There is on view an all-enamelled cooker fitted with the " Carrontrol " heat regulator. Three gas fires are displayed. One in hammered copper has a handsome appearance; the other two are enamelled. In these fires the parts are accessible from the front and can thus be easily removed for cleaning or renewal.

The Carron Company also show two of their gas mantel register grates. In these the mantel is enamelled in imitation mahogany and walnut respectively. These finishes have a rich and natural appearance and are unaffected by heat or climatic conditions. Cleaning is practically unnecessary, an ordinary dust or an occasional rub with a damp cloth being all that is required.

Cochran & Co., Annan, Ltd.,

137, Victoria Street, S.W. 1.

The boiler which this firm have on view has been on permanent loan to the Exhibition Authorities now for seven years and is one of their No. 19 size 7 ft. diameter by 15 ft. high by 600 sq. ft. heating surface, built to withstand 100 lbs. per sq. in. working pressure. It is a working exhibit and serves to supply steam for heating a large portion of the Exhibition building, it being also fitted with a Meldrum forced-draught grate to utilize low-grade fuel and reduce smoke emission to a negligible degree.

Electrolux, Ltd.,

153-155, Regent Street, London, W.

A range of " Freezolux " gas-operated refrigerators is among the exhibits on this stand. The small gas flame replaces motors and compressors customary with many refrigerators. Every " Freezolux " model is entirely automatic and silent and has not a single moving part.

" Freezolux " models range from 1 to 45 c.ft. capacity and include two attractive low-priced air-cooled cabinets—the " Freezolux Minor " (1 c.ft. capacity) and the " Freezolux L.2 " (2 c.ft. capacity).

The " Freezolux Minor," which is stated by the makers to be the lowest-priced self-contained, automatic refrigerator ever offered, can be built-in to the permanent structure of the small house or flat where space is at a premium. It will fit comfortably beneath the draining board, in the dresser or store cupboard, and can then be painted to harmonize with existing decorations.

Ewart & Son, Ltd.,

Euston Road, London, N.W. 1.

On this stand is exhibited Ewart's " Califont " de Luxe, which is a multi-point heater providing a continuous and instant night or day service. An important feature is a safety pilot light, which prevents any risk of explosion in lighting. If the pilot light fails the main gas supply is cut off. There is no condensation, and no drip pipe is required. The heating capacity is 3½ gallons per minute raised 40° F. The special feature is that there are no external valves—the heater is completely enclosed in a hard fired white porcelain enamelled case. The " Califont " de Luxe is capable of supplying not only hot water to bath instantly on demand, but service to the kitchen sink, and lavatory basin in bedroom.

Three examples are exhibited of the " Victor " geyser de Luxe, which is a rapid bath heater of merit and quality. It is finished in porcelain enamelled case with chromium plated fittings and may be supplied in colour—viz., white, almond green, powder blue, or straw yellow. Another popular model is the " Vivo " of which two examples are exhibited one in copper bronze finish and one in chromium plated finish. The heating capacity is at the rate of 2½ gallons per minute.

To provide a service of hot water to lavatory basin or kitchen sink only, two types of heaters are exhibited, the

instantaneous " Brilliant " and the storage pattern heater the " Allhot."

Another type of boiler supplying boiling water for coffee and tea making is exhibited in the " Ever Ready " boiler which is recommended for café and restaurant use. The " Euston " gas-heated towel rail adds comfort to any bathroom, and while warming towels, &c., heats the bathroom to a comfortable temperature.

Gittings & Hills, Ltd.,
Birmingham.

Among Messrs. Gittings & Hills' exhibits are decorative panels showing their new " Fouramel " and varnishes. The interior qualities give four hour drying, and the exterior qualities take eight hours to harden. These materials have good durability and are specially easy of application.

Panels are also exhibited showing various textural designs which may be obtained by the use of " Stip-plex "—a plastic paint composition.

The firm's " Rockhard " synthetic vitreous enamel is a speciality which they have marketed for some years, which fluxes at the very low temperature of 230° F. for two hours, and which gives a finish similar to vitreous enamel under low-temperature stoving conditions and cost. " Rockhard " synthetic enamels and lacquers are now made in four types suitable for all kinds of industrial finishing and painting. An important development in " Rockhard " materials is the introduction of a stoving enamel with heat-resisting properties. This has been evolved in order to meet the requirements of modern economical finishes on articles subjected to comparatively high temperatures, such as gas and electric fire fronts.

Also shown are examples of high-temperature and low-temperature oil stoving enamels, together with " Metalard " tool and machinery enamel finishes.

Pegson, Ltd.,
Coalville, Leicestershire.

Among the exhibits on this stand is the Pegson double-deck " Livewire " vibrating screen. The vibratory movement is intensive, yet gentle. Some 1800 live pulsations per minute are transmitted to the screen cloth by the vibrating unit, which consists of only one moving part rotating in sealed dust-proof bearings. This action rapidly grades the material without damage to even the most delicate substance. The " Telsmith " vibrating screen is of heavier construction than the " Livewire," and is primarily constructed to deal with such materials as are too bulky for the " Livewire." The vibratory movement is produced by a steel shaft to which are fixed two roller bearings with eccentric centres. The vibratory movement, though powerful, is smooth and is so balanced that no vibration passes beyond the screen frame. The Pegson vibrating table, also shown, is primarily constructed for the consolidation of pre-cast concrete slabs, curbs, fence posts, and similar articles.

Built on the internal combustion principle for the rapid consolidation of the backfilling of trenches, the Pegson rammer is a self-contained unit. No triggers or hand levers are employed; the machine is operated by the handle bar. The rammer is simple in construction, runs on commercial benzole mixture, can be operated by unskilled labour, and is a precision engineering job throughout.

A typical de-breezing installation consisting of a " Livewire " 3 ft. by 1 ft. 9 in. de-breezing screen and bagging chute is also exhibited on the Pegson stand.

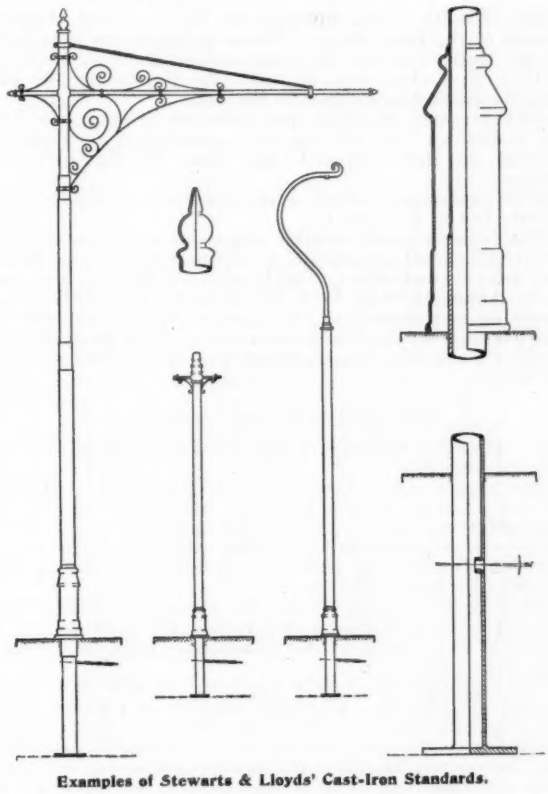
Skylux, Ltd.,
22, Great Saint Andrew Street, London, W.C. 2.

This firm's exhibits include the Skylux tube and rod benders, belt lacing machine, pipe and cable laying machine, and the " Welcome " gas cylinder truck and stand; also various samples illustrating their range in screw and gear cutting.

The Skylux pipe and cable laying machine, although having been on the market for but a comparatively short period, has aroused considerable interest. This machine is capable of laying pipes and cables under roads, railway permanent ways, lawns, &c., without disturbing the surface. In the case of roads, for instance, where it is desired to lay a pipe from one side to the other, the disturbance of a concrete surface is obviously an expensive business. By means of the Skylux pipe and cable laying machine, the pipe can be laid under the road without any disturbance of the surface.

Stewarts & Lloyds, Ltd.,
Broad Street Chambers, Birmingham.

On this firm's inside stand there is a comprehensive selection of wrought iron and steel screwed and socketed tubes and fittings. Larger pipes for mains and distribution systems are also shown with joints to suit all conditions. Among these special attention might be drawn to the " Johnson " coupling for plain ended pipes, and to Stewarts' spherical welded joint. Each of these provides some 5° flexibility during laying, the spherical joint, of course, becoming rigid when welded up.

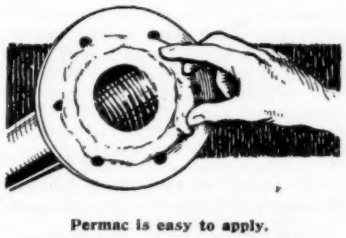


Examples of Stewarts & Lloyds' Cast-Iron Standards.

" Security " coating and wrapping, a new corrosion resisting covering specially designed for the protection of service pipes, is also worthy of inspection. An item of great interest is the new all-steel poles for gas lighting. Models of these are exhibited on the inside stand, and the poles themselves are shown in use in the outdoor section. In this improved design all castings have been eliminated, the ornamental bases, the finials, and even ornamental collars, if these are required, being made of steel. The gas poles shown are of the " Reservoir " type, in which the pole itself acts as the supply pipe, but all-steel poles of the ordinary type for use with an internal supply pipe can also be supplied.

Thomas & Bishop, Ltd.,
37, Tabernacle Street, London, E.C. 2.

Engineers are using " Permac " metal - to - metal jointing material because of its efficiency and economy. " Permac " joints cannot leak or blow out; they are claimed to stand up to all temperatures and pressures, and are trouble free.



Permac is easy to apply.

This firm's " Flexo " B asbestos furnace cement is valuable for building and repairing furnaces and for stopping air leaks round boilers and flues. It is guaranteed to bond all joints exposed to intense heat up to 1400° C. Heat only serves to make it more binding; it does not crack, shrink, or become porous—and allows no escape of gas or fumes. It adheres readily to any surface—metal or brickwork—and sets cold. " Flexo " belt dressing was put on the market to meet the need for a thoroughly reliable British-made belt dressing at a low price. It is the result of over 30 years' experience in the production of belt treatments, and prevents all belt troubles such as slip. " Flexo " is a definite belt food, containing the right animal and other oils to give the belt all the nourishment it needs; it works right down into the fibres keeping them in good condition.

Institution of Chemical Engineers

Twelfth Annual Corporate Meeting

The Twelfth Annual Corporate Meeting and Annual Dinner of the Institution of Chemical Engineers were held at the Hotel Victoria, Northumberland Avenue, London, W.C. 2, on Friday, Feb. 16, 1934—the PRESIDENT, the Rt. Hon. Viscount Leverhulme, in the chair.

At the outset the PRESIDENT referred to the great loss the Institution had suffered by the deaths of Sir Frederic Nathan, in December last, and Prof. W. E. Gibbs, in January.

(The meeting observed a short period of silence as a tribute to the deceased.)

The PRESIDENT acknowledged the valuable support he had received from all members of the Council during his second and final year of office. The Institution, he said, was one of the youngest of its kind, but it was in a very healthy condition and showed all the signs of vitality and growth which were associated with the young. That was reflected in the membership figures, which were 661 in 1930 and 760 in 1933.

ANNUAL REPORT AND ACCOUNTS.

The Council's Report and Statement of Accounts for 1933 were presented.

The report stated that the Institution had closed its annual accounts with a sufficient balance to cancel the accumulated deficiency, as well as to create a reserve towards the expenses in connection with the forthcoming Chemical Engineering Congress. A balance of £4 7s. was carried forward to next year.

With regard to education, the Council recorded with interest the establishment of an undergraduate Course in Chemical Engineering at the Manchester College of Technology during the year.

The year had been marked by great activity in the Appointments Bureau. A greater number of vacancies had been notified than in recent years, and as a result of the prevailing conditions a larger number of suitable candidates had been available, while prospective employers had been more exacting than usual in their methods of selection. It was pleasing, therefore, to be able to record that a high proportion of the vacancies had been filled by members, for many of the inquiries had not been confined to the Bureau. It was abundantly clear that the employers still held the Bureau in high appreciation as a medium for satisfying their requirements. Appreciation was expressed of the work of the Hon. Director, Mr. H. J. Pooley.

The Council reported that arrangements were in hand for the organization of a Chemical Engineering Congress as a sectional meeting of the World Power Conference; the official date had not yet been fixed. The Institution would be represented. Viscount Leverhulme would be President of the Congress; the President of the Institution at the time of the Congress, and Sir Robert Hadfield, would be Vice-Presidents of the Congress; Mr. W. MacNab would be representative on the Grand Council; and a number of the Institution's representatives would serve on the Organizing Committee.

The Council is taking steps to compile an "Index of Experience" to cover the whole range of chemical engineering experience of corporate members of the Institution. The Index, which will be of the greatest assistance in answering requests for expert help, will be a revision and extension of the Register of Consultants inaugurated some years ago.

OFFICERS AND COUNCIL.

The result of the ballot for the election of Officers and Members of Council was announced as follows:

President.—Mr. W. MacNab.

Vice-Presidents.—Dr. H. Levinstein and Mr. H. Talbot.

Hon. Secretary.—Mr. H. W. Cremer.

Hon. Treasurer.—Mr. F. A. Greene.

Members of Council.—Dr. W. R. Ormandy, Dr. A. J. V. Underwood, Mr. S. G. M. Ure, and Mr. C. Chapman (Associate Member).

PRESENTATION OF MEDALS FOR 1933.

The Osborne Reynolds Medal, awarded for services to chemical engineering, was presented to Mr. H. W. Cremer (Hon. Secretary of the Institution) for the year 1933.

The Moulton Medal for 1933 was awarded for the papers on "The Mechanical Properties of Some Austenitic Stainless Steels at Low Temperatures," by Messrs. E. W. Colbeck, W. E. MacGillivray, and W. R. D. Manning; and "The Mechanical Properties of Metals at Low Temperatures, Part II., Non-Ferrous Materials," by Messrs. E. W. Colbeck and W. E. MacGillivray.

The Junior Moulton Medal and Prize were presented to Dr. E. H. T. Hoblyn for his paper on "The Solvent Extraction of Sulphur from Sicilian Ores."

PRESIDENT'S ADDRESS.

Viscount Leverhulme delivered an address on Chemical Engineering and the Edible Fat Industry.

MODERN METHODS OF ATTACKING HEAT TRANSMISSION.

At the afternoon session a paper on this subject was presented by Prof. C. H. Lander, C.B.E. (Professor of Chemical Engineering, Imperial College).

ANNUAL DINNER.

At the Annual Dinner Lord Leverhulme presided over a company of some 200 members, ladies, and guests.

Mr. W. A. S. CALDER proposed "His Majesty's Ministers," and coupled with the toast the name of Sir E. Hilton Young.

Sir EDWARD HILTON YOUNG, in response to the toast, said his duties as Minister of Health brought him closely into touch with many members of the Institution, and he specially mentioned the prevention of pollution of rivers. In the short period during which he had held office he said he had learned what a great deal in that connection had already been accomplished by the aid of science and the combinations of science represented by the chemical engineer, in purifying their rivers. The Institution was one of the good consequences of a great evil, that great evil of the war, because it was established in consequence of the need which was then made manifest for such an organization. Referring to the manner in which the work of the chemical engineer was proving so valuable to the nation, Sir Edward mentioned the hydrogenation of coal and said he knew chemical engineers would welcome the recent advances made by the Government for the encouragement of this process for producing oil from coal. Sir Edward went on to speak of the mutual relations between the profession and the Ministry of Health and expressed satisfaction with the services rendered to industry by the Alkali Inspectors of the Ministry of Health. At the same time he added his appreciation of the manner in which the Ministry of Health's inspectors were now received by industry generally, and contrasted the present position in that respect with what used to be the atttitude adopted towards any form of Government inspection. Now, however, the services of such inspectors as the Alkali Inspectors were welcomed by industry, and such an attitude was proving to be for the benefit of the nation as a whole.

Mr. F. D'ARCY COOPER proposing "The Institution of Chemical Engineers" said he was associated with a company concerned with oils and fats, and he knew on the best of authority how essential the chemical engineer was to industry to-day.

Lord LEVERHULME, in his response to the toast, contrasted the greater freedom to develop industry in the days of his father with those obtaining to-day, although, in view of what Sir Hilton Young had said regarding the Alkali Inspectors, he hastened to add that he did not lay the restrictions at the door of the Ministry of Health. In this connection, also, he mentioned an incident in which his father had argued—and carried the day—that all the profits made during the previous year should be put back into the business and spent on advertising. He did not know, he said, what would happen to-day if it were suggested at a shareholders' meeting that such a course should be adopted and whether the requisite authority would be granted, but at any rate he suggested it was a tribute to the philosophy of the Victorian period which had enabled many of their leading industries to be established. Finally, Lord Leverhulme expressed his thanks to the Council and members of the Institution for the support they had given him during his two years of office as President.

Mr. W. MACNAB proposed "Our Guests," and after mentioning the principal guests spoke on the question of the education of the chemical engineer, in which respect the Institution was working in close touch with those colleges which had established chemical engineering courses. He was satisfied, he said, that under the ægis of the Institution and the colleges chemical engineers were being turned out who would be of the greatest service to the nation.

Lord MELCHETT said that the hydrogenation of coal was a special case of private enterprise being related to national policy. This was not a spasmodic thing or something that had occurred by chance. It was the result of very long and arduous work and considerable expenditure and foresight on the part of the people who had been engaged in it.

The final toast of "The President" was proposed by Mr. J. ARTHUR REAVELL and was briefly responded to by Lord LEVERHULME, who asked the Institution to give to his successor—Mr. MacNab—the same support that has been given to himself.

Carbonization in Semi-Intermittent Vertical Retorts*

By E. L. Wallis, Assoc.M.Inst.Gas E. (Dudley).

The choice of a gas-making plant is fundamentally dependent upon the calorific value of the gas to be made in view of the average price which can be obtained for the residual coke in relation to the cost of coal delivered to the gas-works, the ground space available, labour, and maintenance costs.

Mr. J. E. Blundell has shown that, if the average price obtained for the whole of the coke produced is not more than 10% above the cost of coal, gas can be produced in continuous vertical retorts and analogous systems and put into holder at a lower cost at the lower calorific values, other factors being equal or equivalent. Emphasis must be placed upon the phrase " average price obtained," and it is very seldom the case in this country that this figure is such as to justify the production of gas at any higher value than that necessary to get it through the distribution system.

The calorific value is limited at the lower end, then, by the capacity of the distribution system, in the first place, although generally the limit for this reason is not likely to be above 450 B.Th.U. in any English undertaking of moderate size and average age, and, in the second place, by the character of the coals obtainable at a reasonable price, although here again, with the possible exception of Durham coals, all the standard English coals can be " steamed " very readily down to 450 B.Th.U. and even with the Durham coals this difficulty can be overcome by the use of separate water gas plant.

Gas-Making Systems Compared.

Of the three principal systems available, therefore, the horizontal retort, the intermittent vertical retort, and the continuous vertical retort, it may be said that the first suffers from the necessity of the provision of separate water gas plant with high production costs when making gas at, say, 450 B.Th.U., while in the other two systems water gas is generated within the retort system.

On the other hand, the quality and quantity of coke produced must be considered. Horizontal retort coke is of large and heavy nature and is discharged hot from the retorts, thus requiring outside quenching and loss of heat which might be better utilized. The coke also contains about 3% volatile matter, most of which, perhaps, is from the uncarbonized ends of the charge, but which would be of more use if employed for gas making. If water gas is to be added, then the quantity of coke for sale suffers, because, whereas 1,000 c.ft. of water gas is made for the expenditure of about 15 lbs. of coke within the vertical retort, more than twice this quantity is required in the separate water gas plant.

Continuous vertical retort coke is discharged cold and contains very little volatile matter, but owing to the nature of the process, in that the charge is continually moving, the coke is of smaller and friable nature and has a tendency to form a large amount of breeze.

Intermittent retort coke somewhat resembles horizontal coke but is of a denser nature. It is usually subjected to outside quenching.

It is possible for horizontal and intermittent coke to contain up to 7% and more of moisture, and in these days of keen competition a discriminating buyer is apt to look askance at paying 20s. or more per ton for water.

Flexibility.—Continuous vertical retorts, and the new form of retort I shall describe later, have the very great advantage that their gas production can be accelerated or decelerated within a very short time so that the adjustments incidental to bringing in or laying off different carbonizing units can be made without any dislocation of works routine. Continuous vertical retorts, however, require at least 8 hours after charging before gas making to their fullest capacity, whereas horizontal and intermittent retorts can be on full load at a few minutes' notice.

Thermal Yield per Unit of Ground Space.—In this respect, which is very often of great importance, the results from continuous vertical retorts are far above those of intermittent and horizontal retort systems. This is a factor in favour of continuous vertical retorts where ground space is limited. Next to these come intermittent systems followed by horizontals.

* From a paper before the Midland Junior Gas Association, Birmingham, on Feb. 1, 1934.

Labour and Maintenance Costs.—The highest costs in this direction are those of horizontal systems and the lowest are intermittent systems.

To improve the coke quality and to overcome some of the difficulties inherent in the usual form of intermittent retort, the West-Vertical system of carbonization has been designed.

Two experimental retorts of this type have been installed together with continuous verticals in the same setting, by the Dudley Gas Company. They are of size 90 in. by 9 in. at the top and 96 in. by 14 in. at the bottom, are constructed entirely of silica and of the usual shape of the Glover-West continuous vertical retort. The combustion chambers are arranged horizontally so that the highest temperature may be maintained at any desired point down the retort to suit the class of coal being carbonized.

[At this stage the author outlined the new system, which was described in the " Journal " for Oct. 18, 1933, in our abstract of B.P. No. 395,092. We reprint our abstract below.—Ed. " G.J."]

This invention relates to vertical retorts, and has for its object a method of working which will give a dense strong coke and which will avoid the discharge of a glowing mass requiring quenching with water. A further object is to avoid escape of large volumes of gas from the carbonizing chamber when a new charge is being introduced, and to economize in the time taken for carbonizing and steaming, so that the output capacity of the plant can be increased.

The invention comprises a vertical retort having carbonization, intermediate, and cooling zones. The cooling zone has steam inlets thereto and comprises a coke discharge chamber equal in capacity to one-half or other aliquot part of the cooling zone capacity, the cooling zone being proportioned to hold the coke from a complete charge in the carbonization zone. The arrangement is such that it takes two or more emptyings of the coke discharge chamber to discharge the contents of the cooling zone, which is equivalent to the coke resulting from the carbonization zone.

The sequence of operations in the plant will be understood from figs. 1-6.

In fig. 1 the complete retort (comprising the carbonization zone A, the intermediate zone B, and the cooling zone C) is full. The zone A contains hot completely carbonized coal, the zone B some hot coke, and the zone C cool coke. The hinged wall *e* and the valve or gate *d* thereon are moved to cut the coke discharge chamber off from communication with the remainder of the cooling zone C and to enlarge the coke discharge chamber, so that the coke therein will not be held up by the sides of the chamber but will fall freely on to the plate *p* when the discharge door is opened. This position of the parts when discharge is taking place from the coke chamber is shown in fig. 2. Steaming may continue during all the stages of operation, the quantity of steam admitted being controlled to suit the conditions, being for example a minimum in figs. 1 and 2 conditions, and a maximum in the conditions shown in fig. 6.

After the contents of the coke chamber have been discharged, the wall *e* and gate *d* are returned to their original positions and the discharge door *k* is closed. If desired the latter may not be completely closed in order to permit air to escape from the coke chamber during the descent of the next charge from the upper portion of the cooling zone.

Fig. 3 shows the retort after the second filling of the coke chamber. The relative cool lower portion of coke from the intermediate zone is now in the space immediately above that which will be occupied by the gate *d* when it is again closed, and so acts to protect the gate from the hot-carbonized coal from the retort. The contents of the coke chamber are again discharged, and vigorous steaming and cooling of the hot coke which is above the gate *d* commences. When the discharge is completed the wall *e* and door *d* are again moved to charge the coke discharge chamber afresh. This is the position of affairs indicated in fig. 5. The coke from the intermediate zone now rests on the plate *p*. A new charge of coal is fed into the carbonization zone (see fig. 6), and carbonization and steaming proceed simultaneously until carbonization is completed, when the cycle of operations is repeated. As the intermediate zone always contains hot carbonized material, the water gas reaction can proceed continuously and even when there is a new charge of coal above such zone.

The steam which is admitted to the zone C effects the cooling of the coke therein, but it is converted into water gas in the intermediate zone where the necessary temperature is maintained by heat from the lowest combustion chamber *c*.

If desired, the capacity of the coke extractor chamber may be adjustable to ensure the maintenance within the retort after

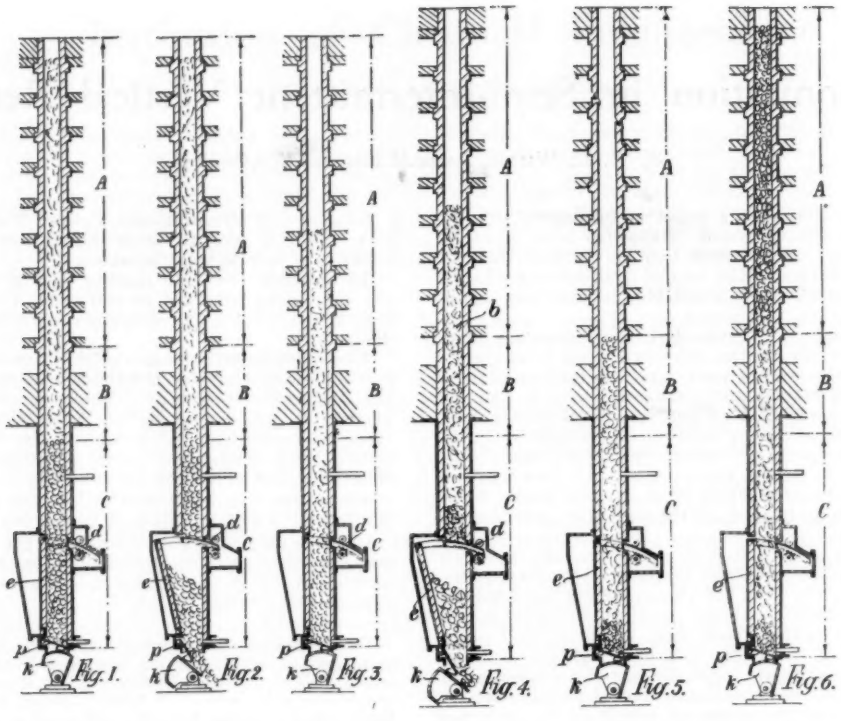


Fig. 1. Fig. 2. Fig. 3. Fig. 4. Fig. 5. Fig. 6.

the cooling space has been charged of sufficient hot carbonized material to fill the predetermined intermediate zone which isolates the carbonizing from the cooling portions of the retort.

Continuing, the author stated:

In charging it is our usual practice to leave a space of 2 ft. 6 in. above the charge inside the retort with a view to cracking some complex hydrocarbons in this hot space.

At Dudley we have tried various times of carbonization varying from eight hours to twelve hours per charge. In the case of the eight-hour charge we found that the charge was slightly uncarbonized, and also the second discharge of coke was inclined to be incandescent, but upon increasing to nine hours these difficulties were overcome.

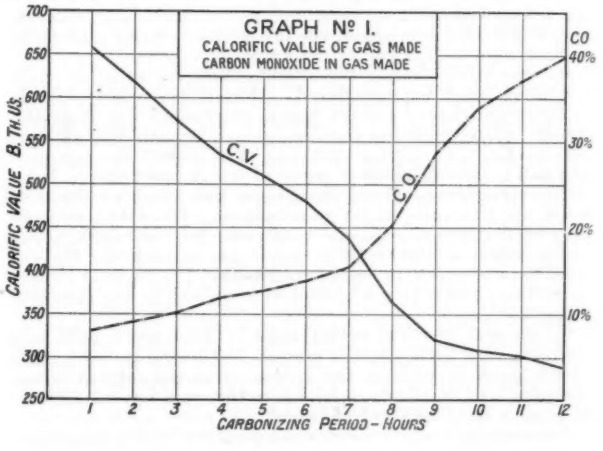
Throughput.

The space occupied by the retorts—*i.e.*, 90 in.—is just the same as that of two 40-in. continuous vertical retorts in the amount of bench space occupied, and at a throughput of 4 tons per 40-in. continuous retort, the equivalent throughput of a 90-in. retort should be 8 tons. The intermittent system, however, being of a static nature, is of necessity of lower throughput than continuous verticals, and the following throughputs have been obtained:

Duration of Charge.	Throughput.	Expressed as % of Throughput of Continuous Verticals.
8 hours	8·25 tons	103·1
9 ,,	7·33 ,,	91·6
10 ,,	6·60 ,,	82·5
11 ,,	6·00 ,,	75·0
12 ,,	5·50 ,,	68·7

Owing to the fact that the gas stream from the intermittents joined that of continuous verticals it has been impossible to give any figures of actual gas makes per retort. Gas samples, however, have been taken at intervals of gas making and clearly show the alteration in composition of the gas with time of carbonization.

Graph No. 1 gives the decrease in calorific value and the increase in CO content of the gas with time.



As previously mentioned, it has been impossible at Dudley to measure actual gas make figures for these retorts, but figures have been supplied to me, taken from a test retort giving the following hourly makes after charging:

Hours After Charging	1	2	3	4	5	6	7	8	9	10	11	12
Make in thousands	4·95	4·59	4·86	5·04	5·22	5·67	5·76	6·03	6·19	6·27	6·33	6·40

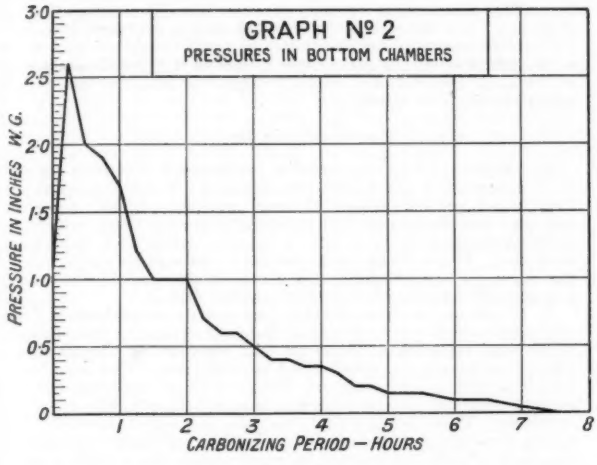
Table I.—*Composition of Gas Made.*

Hours After Charging	1	2	3	4	5	6	7	8	9	10	11	12
CO_2	4·2	5·3	5·4	5·8	5·9	6·5	6·0	5·8	6·2	5·7	5·7	5·6
O_2	0·5	0·4	0·4	0·3	0·2	0·2	0·1	0·1	0·1	0·1	0·1	0·1
C_nH_m	4·5	4·7	5·0	4·2	4·0	3·2	1·5	0·9	0·3	0·0	0·0	0·0
CO	8·0	9·0	10·0	11·8	12·6	13·8	15·4	20·3	28·6	33·9	37·0	39·8
H_2	37·8	43·8	49·7	52·1	54·1	51·4	56·0	58·0	57·1	52·9	51·1	49·5
CH_4	40·6	33·8	26·9	23·0	20·3	19·5	17·2	11·0	3·7	2·8	1·8	0·8
N_2	4·4	3·0	2·6	2·8	2·9	5·4	3·8	3·9	4·0	4·6	4·3	4·2
	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0	100·0
Calorific value (calculated).	658·6	617·5	577·2	533·2	510·5	479·9	436·5	363·8	319·0	306·7	300·8	286·6
Specific gravity (,,).	0·485	0·464	0·435	0·437	0·437	0·460	0·425	0·434	0·474	0·513	0·536	0·549

From these figures and from the gas analyses above the following average calorific value gas is made:

Time of Charge . .	9 Hours.	10 Hours.	11 Hours.	12 Hours.
Average calorific value	489	468	451	435

The average thermal yield of one gas-making plant for the past year has been 89·7 therms at 450 B.Th.U. declared calorific value, and has been maintained while the intermittent retorts have been working, the carbonizing temperatures at which all retorts have been worked being 1,350° C. Observations have also been made of the pressure in the bottom chamber, there being a pressure gauge fitted for this; these pressures are shown in Graph No. 2.



Scurfing of the retorts is done every fourteen days, and the process is completed in about twelve hours. Longer periods between scurfing have been tried, but resulted in slight hanging up of the charge.

Some trouble at first was experienced with partial stoppage of gas mains, but continual circulation of hot liquor through the hydraulic main has overcome this difficulty.

Coke.

In installing these intermittent retorts our primary object was to obtain a larger coke than we have been getting with continuous vertical retorts, and a coke more nearly of horizontal retort coke density, while retaining the vertical retort advantage of dryness. This was needed to supply certain customers who used horizontal coke which shortly would not be available.

The coals we are using are as follows:

	%
Yorkshire	37·5
North Staffs.	45·0
Derbyshire	17·5

Although of good gas-making properties, yet on the whole these coals are of the softer coke forming varieties, and we have been troubled in our continuous vertical coke with a rather larger amount of breeze than is desirable, owing to the friability of the coke formed. Smallness of coke has also been a complaint. It is of the utmost importance that the coke market should not be neglected, and to be able to supply a coke suitable for all purposes is the greatest aid to being able to sell it. We at Dudley are in the position of being able to sell locally all the coke we can make, but others are not so fortunate.

Perhaps a reason for our large breeze content is the high thermal yield per ton of coal we obtain; but, after all, we are primarily a Gas Company.

As a first comparison of the coke from continuous vertical and intermittent retorts, detailed gradings over a good period were made.

Table II.—*Results of Grading Tests.*

[Expressed as Percentages.]

—	Over 2 In.	2 In.–1½ In.	1½ In.–1 In.	1 In.–½ In.	½ In.–¼ In.	Under ¼ In.	Over 1 In.
Continuous vertical coke	20	25	24	16	7	8	69
Intermittent coke—							
9-hour charges . .	26	28	16	14	8	8	70
10-hour ,, . .	39	26	16	10	4	5	81
11-hour ,, . .	41·5	24·5	16	10	4	4	82
12-hour ,, . .	39	26	18	10	4	3	83

Shatter tests were made on all samples, according to the British Standard Specification for the sampling and analysis of coke in which 50 lbs. of the grading "over 2 in." is dropped four times on to a steel plate from a height of 6 ft. and again graded. The results are given in Table III.

Table III.—*Results of Shatter Tests.*

[Expressed as Percentages.]

—	Over 2 In.	2 In.–1½ In.	1½ In.–1 In.	1 In.–½ In.	½ In.–¼ In.	Under ¼ In.	Bulk Density.
							Lbs./c.ft
Continuous vertical coke	35	33	19	8·0	2·5	2·5	20·5
Intermittent coke—							
9-hour charges . .	38	31	17	9·5	2·5	2·0	24·0
10-hour ,, . .	44	29	14	9·0	2·0	2·0	24·5
11-hour ,, . .	44	30	16	7·0	1·5	1·5	25·0
12-hour ,, . .	44	29	18	8·5	1·5	1·0	25·0

The difference between the cokes is clearly shown in these tables, there being a marked lessening of the amount of small coke in that from the intermittent retorts. The bulk density also shows an increase pointing to a harder and denser coke. The results of the shatter tests clearly show the lessened friability of the intermittent retort coke. Sections of coke on comparison make the difference self-evident.

For the purpose of further examining and comparing the cokes, they were tested for ease of ignition and burning qualities. The apparatus used for this test varied from that which is generally used as it consisted of a coke boiler with complete circulating system.

The fire was lighted by means of a gas poker inserted through the door of the boiler, the gas pressure to this being maintained constant, and the amount of gas passed was metered.

In all tests, 10 lbs. of coke were used, consisting of the grading 1 in. to 1½ in., and the water content of the system was maintained constant.

It was felt that visual observation of the fire and its point of ignition were not sufficiently accurate to arrive at a decision as to when the point of ignition had been attained, and so it was decided to take a definite temperature as being the point of ignition when the gas poker could be shut off and removed. After several trials the temperature of 240° F. was decided upon.

At the end of each test the ashes were carefully collected and weighed.

The results of these tests are set out in Table IV.

Table IV.—*Ignitability Test.*

Fuel.	Moisture.	Volatile Matter.	Ash.	Gas Used for Ignition.	Time for Ignition.	Maximum Temperature Obtained.	Weight of Ash.
	%	%	%	C.Ft.	Mins.	°F.	Lbs.
Continuous vertical coke	1·03	0·98	5·76	7·70	37	660	1·68
Intermittent coke—							
9-hour charges .	0·76	1·31	5·54	9·36	45	705	1·76
10-hour ,,	0·92	1·01	5·71	10 00	48	700	1·78
11-hour ,,	0·98	0·98	5·68	12·51	60	685	1·81
12-hour ,,	0·97	0·98	5·74	13·95	67	670	1·82

It is noticeable that intermittent coke is slower in igniting than continuous vertical coke, but that it gives a hotter fire. The intermittent coke burns longer than the continuous vertical coke.

The ash content of the coke used in these tests is naturally lower than that of the bulk owing to the fact that only the 1 in. to 1½ in. grading has been used. The average ash content of the bulk coke is about 7·5% and the moisture content both of the intermittent and continuous coke is about 1%.

I have dwelt rather at length on the coke produced by the respective plants, but often the choice of a carbonizing plant is decided by the coke produced.

In general, the plant gives a dense coke which is discharged cold from the retorts. By staggering the time of charging, the large variations of calorific value of the gas at the commencement and finish of the carbonization period can be obviated so as to give a constant average calorific value.

It is impossible to give any figures with regard to labour charges, as the intermittents are worked in conjunction with continuous vertical retorts, but careful observation has led to the conclusion that the labour required on an

intermittent system of carbonization is less than that of continuous vertical retorts.

Discussion.

The PRESIDENT (Mr. S. K. Hawthorn) said they were fortunate in having heard that night the first paper given to any association on a new method of carbonizing, and they were indebted to Mr. Wallis for having described the plant and for passing on his rather exceptional experience. This plant seemed to him to be the soundest intermittent system yet developed. The thermal yield per ton was at least equal to that of any other intermittent system, a cold coke was discharged, and there was an entire absence of smoke in the charging operations. The coke was of a different quality, and that was very important; the relative value of the salability of that coke in an established market might make all the difference. The author had made it clear that the coke was not so easily ignitable as continuous vertical coke. Another point was that in an intermittent system the calorific value could not be constant; but with a number of retorts the line would be nearly straight as in the case of horizontals.

Mr. J. H. WAINWRIGHT (Halesowen), in moving a vote of thanks to Mr. Wallis, did not think that the author was quite justified in regard to labour and maintenance costs, in view of the complicated mechanism which appeared to be necessary. He would like to know more about the cut-off plate, which might jam and result in considerable time being lost in making gas. That also would have a bearing on labour charges compared with continuous vertical retorts. In the latter the coal was working down more or less on its own, and there was very little necessity to employ any labour except for poking down. He would like to know if it was possible to maintain a constant calorific value, and the minimum number of retorts on this system considered necessary for that purpose.

Mr. F. J. BENGOUGH (Nechells Works, Birmingham), in seconding, said that the vexed question of labour and maintenance charges was governed by throughput, and he could hardly agree that the labour was less on the intermittent than on the continuous system. He would like some idea of the staff required to run a small section of the retort house with this type of retort.

Mr. W. MACNAUGHTON (Wolverhampton) said he would like an analysis of the coals or to know the pits from which they came. With a mixture as submitted they could get with continuous verticals as good an analysis as that given in the paper. As to the 14 days for scurfing, he would like to know what the condition of the silica was how long it would be before extensive repairs were needed.

Mr. T. F. E. RHEAD (Birmingham) said the new method combined very valuable features of both horizontals and continuous verticals—like horizontals it gave a high figure for enriching hydrocarbons, and like continuous verticals it steam-quenched the coke, recovering the heat as blue water gas. A knowledge of the temperature distribution would be useful in view of the fact that the charge was 14 in. thick at the bottom and only 9 in. at the top. Further, as the carbonizing of the coal and the cooling of the coke were apparently finished an hour or two before the discharge, what did the blue water gas cost in fuel, during the last two hours? It was most instructive to see how increased carbonizing time increased the amount of gas necessary to ignite coke in the domestic boiler tests. This seemed to indicate increased graphitization with increased baking of the coke.

Mr. A. V. NORTH (Dudley) said that no disintegration had yet been noticed in the brickwork. Continuous verticals had to be discharged the same as intermittents, only one discharged them more often.

Mr. J. C. COTTERILL (Worcester) pointed out that all the intermittent coke seemed to take a greater time and more gas to ignite than the continuous vertical, and from that point of view it seemed to him that it was not such a good coke. Could the author give them any idea of the calorific value of the coke coming from the intermittent retorts, and how it compared with that from the verticals.

Mr. REYNOLDS remarked that if they had got only two experimental retorts surely they must have had trouble with calorific value on the district. He took it the minimum number would be eight. He thought 14 days an exceptionally short period for scurfing. Was there any mechanical means necessary?

The PRESIDENT remarked that the total height of the retort appeared to be much greater than that of a normal retort, and if it was at the end of a normal vertical setting the base would reach the floor or nearly so.

THE AUTHOR'S REPLY.

Mr. WALLIS said they usually commenced steaming two or three hours after the retort was charged. The throughput was only based on the amount of bench space occupied. He could not give any figures of fuel consumption with these retorts, as they were working on a bench in connection with continuous verticals. The bottom discharge door had a rubber strip round the door, on top of which was a steel plate, and by tightening the eccentric they got a perfectly tight door.

As to labour, on verticals they had poking every hour and the discharge every one and a half hours, but on the intermittent there was no poking whatever and they made the discharge about ten hours per retort, and it might take five minutes or so. The only attention, apart from watching pressure, was five minutes in ten hours, which compared favourably with the verticals. They did not find that the cut out "jammed." As to the limitation of the calorific value by distribution he pointed out that calorific value must be regulated by the specific gravity of the gas.

It has been found that intermittent retorts did not spall. The percentage of steam was about 20. No water spray was used in quenching the coke.

The smallness of the coke was due to both the carbonizing and the screening plants. The retorts had been working for six months, and they scurfed in 14 days; that took 12 hours. A vertical might run for 10 weeks, but it would take 3 or 4 days to scurf, so that the time the intermittent retort was idle was less than with the vertical. They could not separate the tar. The cut-off plate simply pushed the coke away from it. As to calorific value varying, the amount of plant they had had on while these retorts were working had been so great that they had not noticed any fluctuations.

The Washing of Gas

Joint Discussion on the Paper by Messrs. Hollings and Silver published in the "JOURNAL" for Feb. 7, and that by Mr. Silver which appeared in the "JOURNAL" last week.

Dr. W. R. ORMANDY inquired how the authors determined the wetted area of the brush in the washer.

Mr. H. D. GREENWOOD first referred to the partition factor with reference to the scrubbing of ammonia, carbon dioxide, and hydrogen sulphide from coal gas, and pointed to the reference in the early part of the first paper to the fact that the partition factor was not affected by the presence of the latter two gases. Generally, he said, the efficiency of scrubbing ammonia was appreciably affected by the amount of ammonia in the gas, and the efficiency varied according to the amount of carbon dioxide and hydrogen sulphide. In view of the fact that the ratio of carbon dioxide to ammonia changed during the process, that would probably affect the partition factor. He asked the authors' views as to whether that was the case, and if so how much did it affect the partition factor.

The second point raised by Mr. Greenwood concerned the value of the graph in fig. 1 of the first paper, which showed the relationship between the slip—among other things—and the amount of liquor circulated. If the expression given in that graph related to the ordinary tower scrubber of a gas-works—which he presumed was intended—it was not applicable to the multi-stage washer. If the amount of liquor over the scrubber was altered, presumably the distribution over the packing would be altered, and therefore the expression from which the curves were derived would not hold. Could the authors say what was the value of these curves in relation to the actual practice on a gas-works using that type of scrubber?

Mr. R. D. REES asked what was roughly the concentration of the sulphur dioxide and the sulphuretted hydrogen in the gas.

Mr. A. G. GRANT, referring to film transfer co-efficients, pointed out that it was emphasized in the paper that "the film transfer co-efficients may be defined as the number of pounds of solute transferred per hour per square foot of interface when the concentration difference across the film was one pound of solute per cubic foot." Later in the paper the authors referred to the concentration difference between the actual concentration in the gas and the concentration which would apply if the gas were in equilibrium with the liquor. Could the authors confirm the first statement, because it did not seem to him to be quite complete? It should read, not per unit concentration difference, but per unit concentration difference between the actual concentration and the equilibrium concentration. In the paper, also, it was not stated whether the transfer co-efficients had been calculated or were obtained on washer tests.

Mr. H. GRIFFITHS asked whether it was really possible to design a counter-current tower scrubber to do a specific duty without getting into unreasonable proportions. He did not know what the experience had been in the Gas Industry, but in the chemical industry it was usually necessary to convert a tower scrubber into a multi-stage scrubber, to split it up into sections and re-circulate the liquid through the tower to avoid unwieldy proportions. Was it not the fact, therefore, that it is almost impossible to design a really satisfactory counter-current scrubber?

VALUE OF THE WORK.

Dr. R. LESSING said it might be interesting to state that at any rate one formula—formula No. 14—representing counter-current work had actually been evolved in practice by one of his

assistants—Mr. Winterbottom—in connection with countercurrent work. That had been done for an entirely different purpose, but when a washing problem was being considered it was found that this formula could be applied practically in its entirety. Dr. Lessing said he mentioned this to demonstrate the value of this type of work. A point on the practical side was that the experimental work on which these formulæ and graphs had been based made use of pure solutes and pure gases, but in practice these particular conditions did not usually apply. Many of the curves shown by Mr. Silver indicated that traces of CO_2 in the gas facilitated absorption, and that brought him to the point which must not be overlooked—viz., that chemical reaction had to be taken into account in these things, and wherever a reaction which would chemically combine and absorb a gas could be applied, it was all to the good. It had been shown, for instance, that where SO_2 was absorbed in a caustic soda solution, absorption was facilitated as compared with the case when it was absorbed by a dilute sulphuric acid solution. This reminded him of work that was done many years ago when he had the privilege of being associated with the Gas Light and Coke Company. In that case work was done upon cyanogen extraction, and he had been faced with exactly the same problems with multi-stage washers—rotary washers—and in connection with that it had been possible to evolve a scheme which he commended to the authors in developing the practical forms which had become necessary on account of the ammonium sulphate economic conditions. In that particular case, the ferrous sulphate which had to be used in order to obtain the ferrous hydroxide or carbonate for cyanogen extraction was put behind the ammonia scrubbers, so to speak as a catch box, and in that way it was possible to obtain ammonia liquors of the highest possible concentration without any appreciable slip, the slip being taken up by the chemical reaction in the ferrous sulphate. It was quite on the cards that even to-day a process might be evolved by putting a chemical reaction at the end of the ammonia scrubbing and obtaining a high concentration of liquor with good scrubbing.

He was very pleased that the different purposes to which gas washing had to be applied had come out in this research. During the past few years he and his colleagues had been engaged on the question of SO_2 extraction from flue gases, and in that connection he had found exactly the same result. In that case it was entirely a question of the rate of water flow over the scrubber surface, apart from its being a matter of contact rather than spray in order to get a good result. The gas contained only 0·066% of SO_2, and this had to be scrubbed out to the extent of at least 95% with a slip of not more than 5%. In practice it could be done with 2% with quantities of gas passing through the scrubber which in any one unit amounted per minute to the hourly throughput of the rather large scrubbers in gas-works. Therefore, in the case he was referring to it was necessary to deal with vastly greater quantities of material and very much smaller quantities as regards the amount of gas that had to be absorbed from the flue gas. A high water flow had to be used, and the problem therefore was just at the other extreme from the problem of ammonia scrubbing. That problem, however, had been solved. If, added Dr. Lessing, he might answer Mr. Griffiths' question with regard to the construction of scrubbers, it would be to say that on theoretical grounds scrubbers could be calculated to bring about the desired reaction.

Mathematics in Practical Problems.

Dr. A. J. V. Underwood thanked the authors for having shown that, contrary to what many people believed, a little mathematics could occasionally be useful even in practical problems. Fig. 1 in the first paper came to sudden stop at the value $qk = 1$, and there was considerable reticence as to what happened in the region beyond that. There was some reference to it in the second paper in connection with multi-stage washers, but not in connection with tower scrubbers. Some reference ought to be made to this, because a person dealing with the numerical example in which 80 gallons of washing liquid was assumed to be used per 10,000 c.ft. of gas might for some reason or other wish to reduce the quantity to 40 gallons and then proceed to use equation 17 in the paper. If he still wished to reduce the slip value of 5% he would do so by increasing the height of the tower, but the result would be an imaginary tower and not an actual one. He could imagine some reluctance on the part of employers, said Dr. Underwood, on being told there could be an economy of 50% in water by installing an imaginary and not an actual tower! The practical point, he said, was that where the slip was decreased the height of the tower increased at a very rapid rate.

There were other absorption questions, said Dr. Underwood, where there were two components in a gas and where the equilibrium relations between them was affected by the presence of the other. Many of these problems could be treated by some of the methods used in dealing with distillation problems. There was an obvious analogy between absorption and distillation in connection with the gaseous and liquid phases. In fact, the case of absorption was rather simpler, because the movement of the substance absorbed was from the gas into the liquid, whereas in distillation there was generally a movement both ways. There was the more volatile component being transferred from the liquid to the gas and the less volatile component from the vapour to the liquid. In the case of absorption there was a system of one-way traffic, but in the case of distillation there was a more complicated traffic which required more regulation.

Mr. Charles Cooper said his study of the mechanism of transference by absorption had emphasized the analogy with heat transfer, and it was obvious that the two subjects were capable of similar treatment. Even the cases of discontinuous contact could often be treated by calculation of logarithmic means and, alternatively, a continuous contact apparatus such as had been considered in the first paper could be treated as a special case in the theory of multi-stage contact. It was easy to exaggerate the extent to which the diagram of Mr. Silver and M. Bolzinger could be actually applied. For example, when qK was approaching unity, the geometrical construction became more and more difficult to apply. On the other hand, the algebraic calculations also became difficult to convert to arithmetical quantities under the same conditions. On this account he had found it more satisfactory to construct tables embodying the analysis of arbitrary problems over a wide range, and to take actual problems as interpolations. The solution of all such questions on a single manageable chart or nomogram had defied his mathematical faculties, but the insolubility of this difficulty must not thereby be assumed. He was pleased to note Mr. Silver's appreciation of the importance of the internal circulation rate in a multi-stage washing operation. At the same time, it should be pointed out that the actual existence of a satisfactory rate per stage was bound up with the number of stages. For example, there might be a 12-stage machine with apparently an inadequate circulation per stage. By taking out half the diaphragms and joining two stages into one, it was possible to procure a six-stage operation each with an adequate circulation rate, yet the performance of the machine would actually be impaired.

Disturbing Factors.

Referring to two minor points in respect of the data on ammonia washing, Mr. Cooper said the first was that the absorption of ammonia and CO_2 from gas did not, at the weaker end of the machine, follow Henry's law. Hence the characteristic curve of distribution in such a case would depart from the calculated one, without implying an irregularity in the apparatus. Similarly, in many benzole washers, the characteristic curves might show some departure on account of the fact that the ratio of benzene to other hydrocarbons was changing as the gas passed through the washing operation. The other point also referred to ammonia washing; cases might occur where the absorption of ammonia was accompanied by a measurable heat effect. This might often be disguised by other temperature changes which were occurring. It should be most easily detected by a rise in gas temperature after the gas entered, but one or two quite obvious cases had been observed with gas entering with over 100 grains of ammonia per 100 c.ft. He mentioned this, said Mr. Cooper, as possibly having some bearing on the varying values of E in Table I. of Mr. Silver's paper on multi-stage washers.

Prof. J. R. Partington said that although the interesting formula which the authors had put forward required the existence of a partition factor k, there were cases in which such a partition factor did not exist. In the case of ammonia or SO_2 or hydrochloric acid, the gas going into the liquid was the same as the gas coming out, and therefore it could be said there was a partition of the gas between the gaseous phase and the liquid phase; but if they considered the case of nitrogen peroxide, the gas going into the liquid was NO_2 but the gas coming out was NO, and therefore there was no possibility of having a partition factor. It was rather difficult to know what to do in instances like that. The type of mathematics had not been worked out, and his point in mentioning it was to suggest that the authors might consider this a possible further important problem. Also, from the practical point of view, when dealing with the absorption of nitrogen oxides it was easy to get a gas into solution, but when it went into solution it might not be what was wanted. It was easy to get nitrogen slightly oxidized in solution in the presence of NO, but the substance in the solution was mainly nitrous acid, and it all came out again as soon as it was pumped or was otherwise disturbed. The whole of the gas came out unchanged, and therefore there was a problem there, also, of providing, in addition to the absorption system, some arrangement so that the gas in contact with the liquid might be continuously re-oxidized. That raised a trouble which the authors had not dealt with—viz., the nature of the packing. It sometimes mattered a great deal whether the packing provided not only a given surface per c.ft., of packing, but also a given free space; and the design of packing had not, he thought, ever been very successfully tackled by chemical engineers. Sometimes a packing was required which provided so many square feet per c.ft., and it was easy to get that, but one might also require so many c.ft. of space per c.ft. of total packing, so that another problem came in.

The Authors' Replies.

Mr. Silver said that Mr. Cooper's graphical method was a very interesting and valuable one. It included also the circulation rate, but the method given in the paper could also be used to deal with the circulation rate within the bay, and in Bolzinger's paper that was done. With regard to the point that equation No. 17 did not deal at all with the ratio of height to diameter and therefore with liquid distribution, it was true that it made no attempt to deal with liquid distribution, but it did to some extent deal with the ratio of height to diameter, because the main velocity of the gas was determined, and that was obviously influenced by the diameter of the tower. The authors had not gone into distribution anything like so fully as Mr. Cooper, and he believed it had been stated that it was possible to use a distribution factor which to some extent looked after the question of the distribution.

In reply to Dr. Ormandy's question as to how the wetted

area of the brush in the washer was determined, that had been done from figures that had been supplied by the makers concerning the number of bristles and the area of the bristles in the brushes, although he had not counted them! The work on multi-stage washer, in getting at the fundamental equations, was done mainly on film washers because it was possible to measure the area simply, and the desire was to find actual transfer co-efficients. Incidentally, Mr. Silver said that Mr. Grant's definition of transfer co-efficient appeared to him to be the same as set out in the paper.

Mr. GRANT said he wanted it confirmed, but the italicized reference to it in the first paper did not exactly agree with the definition as given later on. He wanted to make sure the two things were intended to be the same.

Mr. SILVER said the concentration difference referred to was the difference between the concentration in the gas and the equilibrium concentration. Replying to the question by Mr. Grant as to actual determinations of transfer co-efficients, Mr. Silver said that a large number had been determined, and they agreed extraordinarily well with those obtained in the small experiments.

Mr. HOLLINGS said he felt that the authors had perhaps suffered a little in regard to the first paper because Section V. had not been dealt with when the paper had been presented. To some extent that covered the questions asked by Mr. Griffiths, Dr. Underwood, and Mr. Cooper, because if it were read carefully it would be seen that an attempt was made in that Section to point out some of the limitations that arose in the application of towers; the limitation of the quantity of liquor distributed per unit area, and the consequent effect of the height of the tower on resistance to flow of gas. The various factors were indicated, and it was pointed out that further work was being done. All these factors were very much in mind. The authors also had in mind the desirability of carrying out work with different packings, which, as Prof. Partington had mentioned, was urgently needed. The authors specially thanked Dr. Underwood and Mr. Cooper for their contributions to the discussion, because they were both recognized authorities in this great field, and even if Dr. Underwood did finally put Mr. Silver on top of a tower of infinite size he would very much like an opportunity of studying the method a little more closely to see by which equations Dr. Underwood managed to do this. Dr. Lessing had referred to the possibility of speeding up this gas washing by chemical means, and special reference had been made to the influence of CO_2 in the removal of ammonia. That was an undoubted factor, and one to which the authors had paid rather special attention; but it had been felt that to have discussed that special case of washing would have taken the authors outside the scope of the paper. It was quite true, however, that by increasing the CO_2 concentration of ammoniacal liquor, a definite beneficial effect could be obtained in ammonia washing.

The CHAIRMAN (Mr. J. Arthur Reavell), proposing a cordial vote of thanks to the authors, emphasized the great value and importance of the paper to all concerned with the problem of gas washing. Even a casual glance at the paper indicated the enormous amount of work entailed in its preparation. The Institution was also indebted to the Gas Light and Coke Company for allowing all the data to be published.

The vote of thanks was carried with acclamation.

Mr. HOLLINGS, in acknowledging the vote, said he was particularly pleased that reference had been made by the Chairman to the Gas Light and Coke Company, because the debt owing to the Company was obvious. The authors were also very grateful to the Board of Directors for allowing the paper to be presented.

Practical Observations on Installing Domestic Gas Water Heaters*

By F. ROBERTSON, of the Cardiff Gas Light and Coke Company.

Every water supply company or authority has its own regulations relating to the fixing of water appliances and fittings, and it is necessary that those concerned with the installation of gas water heaters should be thoroughly conversant with the various rules laid down by those authorities. In Cardiff, for example, no sealed water appliance may be fixed and connected direct to the cold supply pipe, unless the particular apparatus is constructed in such a manner as to show a visible break in the feed pipe. In the case of the ordinary geyser, the makers have solved this problem by fixing the feed pipe vertically at the side of the appliance, and allowing the water to discharge into a funnel arrangement at the top. This method constitutes a break, and this type of geyser can then be supplied with water direct from the cold supply main.

Where a geyser with a shower attachment is required, the circumstances are altered, inasmuch as a visible break in the water feed is not practical, because a certain head of water is necessary to reach the height of the shower rose. The method to be adopted where direct connection to the water main is not permissible is to fix a cold water storage tank of not less than 30 gallons capacity a few feet above the height of the shower, and to connect a feed pipe from the tank to the geyser.

In some districts, and especially the older parts of large towns, the water pressure in the mains falls very low, and this fact should always be taken into consideration when anticipating the fixing of a geyser. In many cases it will be found that when the water tap in the scullery is turned on at the same time as another on the next floor, the water coming from the higher tap will cease completely. Where a geyser is to be installed under conditions such as these, special precautions must be taken, for should the water fail while the apparatus is in use, there is every possibility of the appliance boiling dry, and the interior being completely destroyed.

The obvious procedure is to install a cold water storage tank of sufficient capacity to cope with the largest demand. This will prevent any damage to the appliance through shortage of water, and at the same time will ensure an ample supply of water at all times for bath purposes. If for any reason it is not permissible to fix a storage tank, a geyser which is fitted with an automatic valve may be used. This valve, which is actuated by the running water, will instantly close the gas supply to a by-pass in the event of the supply of water failing.

FLUE ARRANGEMENTS.

No less important than adequate water supply is the necessity of making suitable provision for disposing of the products of combustion. Carrying the flue from the geyser into the false roof is a practice to be strongly condemned. It is only in very rare cases that the flue functions properly, and only the fitting of a well-designed baffler into the flue in the bathroom allows the geyser to keep alight when in use. That a baffler fitted to a geyser or any similar appliance will prevent downdraught is a wrong impression. It will simply deflect the downdraught away from the geyser by baffling it into the room.

A good pull in a flue pipe of this description can only be ensured by continuing the flue pipe out of the bathroom either by way of the roof or the side wall and terminating with an efficient cowl as high as possible above the eaves of the house. The cowl should be designed in such a manner that no birds could nest in the outlet of it and cause an obstruction.

The use of asbestos cement flue pipe to carry away the products of combustion from geysers is becoming a general practice. This material, being of a porous nature, absorbs most of the condensation which occurs in the flue, and so prevents trouble from that source. The baffler and portion of flue pipe inside the bathroom may be coloured with any suitable water paint to match the decorations, but in no circumstances should oil paint be used for this purpose, as by sealing the pores of the material the condensation willl soon saturate and cause the flue pipe to condense more water vapour than a metal flue.

By making a hot bath available at any time of the day or night the geyser has become a very popular appliance, but its usefulness is strictly confined to the bathroom or other situations where it is installed. It does not provide save in exceptional cases a service of hot water at the scullery sink or the lavatory basin, and should this convenience be required a different system will have to be considered.

The great majority of modern houses in soft water districts are fitted with a coal-fired domestic hot water system, consisting of a boiler fitted at the back of the dining room or kitchen grate, a pair of circulating pipes rising to the floor above and coupled to a 20 or 30 gallon copper storage cylinder fed by a cold water storage tank. The hot water cylinder and cold feed tank are usually enclosed in a cupboard which is used for airing clothes. This service of domestic hot water depends, of course, on the use of the coal fire, and offers an excellent opportunity for the installation of a gas-fired hot water appliance which can be used either as an alternative or in conjunction with the coal fire. By heating the water in the cylinder by gas existing hot water points will be served without being dependent on the coal fire. The nearer the circulator is fixed to the cylinder the greater efficiency is obtained with resulting economy of gas.

It is not advisable to fix a gas-heated circulator in a house where the domestic hot water is supplied by the old-type tank system, consisting of a coal-fired back boiler behind the kitchen range, coupled by a pair of circu-

* Paper before the Wales and Monmouthshire Junior Gas Association.

lating pipes to a hot water storage tank, in the roof, unless some alteration is made to the installation. These arrangements are usually very sluggish in circulation, due to the long lengths of pipes rising to the roof space and resulting in great loss of heat.

To connect a gas-heated circulator to the flow and return pipe in the scullery will result in a very inefficient service of hot water and heavy consumption of gas. Should, however, a consumer using this type of system desire the advantages of a gas-heated appliance the following method will be found very effective. A 20 or 30 gallon copper storage cylinder should be fixed in the scullery or kitchen near the circulating pipes and coupled to the gas-heated circulator in the usual way. The old hot water storage tank in the roof can then be disconnected and the existing flow and return pipes utilized as the cold water feed and exhaust pipes respectively to the cylinder. The supply pipe to the hot water taps can then be branched into the exhaust pipe and the circulating pipes from the coal boiler connected up to the cylinder. This job will ensure a good service of hot water from the gas-heated circulator and an improved service from the coal or coke boiler.

Where economy of installation cost is the primary consideration, however, a geyser fitted in the bathroom and a small heater of the storage type fixed near the scullery sink provides a very useful combination, the geyser ensuring a hot bath at any time, and the sink heater providing water for the dish washing and other domestic purposes.

Hot Water for Flats.

For various reasons many of the larger houses are now being converted into flats, and to be properly self-contained each flat is provided with separate bathroom, kitchenette, and, of course, separate gas supply. Hot water for bath and domestic purposes can be successfully provided by gas with either of the following arrangements:

(1) A geyser in the bathroom and a sink heater in the kitchenette, making no provision of hot water at the wash-hand basin.

(2) A combination consisting of a cold water feed tank, hot water storage cylinder, and a gas-heated circulator, which will, of course, provide hot water at the bath, wash basin, and scullery sink from the one gas appliance.

Alternatively, a trickle heater of the storage type can be used with success providing that the demand for hot water is not too great or too frequent. This particular appliance usually comprises a lagged cylinder with a capacity of 12 or 18 gallons of water, which is heated direct by a small burner consuming about 10 c.ft. per hour. There is a distinct disadvantage in the fact that when the water is drawn off for a bath about six or seven hours must elapse before another bath can be obtained. On the other hand, owing to the low consumption of gas, this type of water heater may be fixed without a flue pipe, which in certain cases makes it more suitable than a rapid heating boiler, the higher consumption of which necessitates a flue outlet.

Another very efficient hot water appliance, which may be used with advantage in flats, is the multi-point geyser. These heaters provide no storage, but simply heat the water as it passes through the appliance. The method of fixing is as follows: Provide a cold water feed tank, which must be of about 50 gallons capacity, and fixed at a level of not less than 12 ft. above the appliance. The highest hot water draw-off tap must also be at least 12 ft. below this tank. The object of this procedure is to ensure a pressure of not less than 6 lbs. per sq. in., which is required to actuate the valve on the appliance.

Where the water company makes no objection to direct connection to the cold supply main, the multi-point geyser may be coupled direct without the provision of a feed tank, providing that the pressure does not fall below 6 lbs. A connection is then made from the outlet of the heater and carried in lead or copper pipe to the bath, wash-hand basin, scullery sink, &c. The gas supply must be direct from the meter, and an efficient flue pipe fitted as in the case of the ordinary geyser.

When installing a cold water feed tank as a supply to any hot water appliance it is advisable to ensure that the ball tap is never fitted directly over the outlet of the tank, owing to the fact that the water falling from the ball tap and mixing with air on entering the outlet pipe often leads to the forming of air-lock in the system.

Where the tank is fitted in the same room as the hot water appliance, or in such a place where the noise of the water running from the ball tap would be objectionable, it is advisable to fit what is termed a silencer. This is accomplished by fixing a piece of brass or copper tube to the outlet of the ball tap and extending it down to the bottom of the tank. A small hole must be drilled in the tube above the water level in the tank so that there will be no likelihood of the water being syphoned back into the main.

Where hot water supply pipes have to be fixed to a wall or other support by means of clips, a piece of sheet lead should always be inserted between the clip and the pipe. This precaution is taken in order to avoid the metal of the clips cutting into the pipe during expansion and contraction which is set up by the different temperature of water passing through the pipes.

For Soft Water Districts.

In soft water districts no gas-heated water appliance has any great durability unless constructed entirely of copper. Even those appliances made of cast iron which has been bower-barffed will cause the water to take on a reddish tinge from the rust deposits which form in the boiler after a short period of use.

Some time ago a circulator constructed of porcelain enamelled steel was tested on the district in Cardiff, and in less than twelve months the metal was eaten right through and the appliance rendered useless. As a protection to the metal the enamel covering was useless against the effects of the water. A similar appliance made of steel which had been copperized during manufacture was then tried, and again the effects of the water proved too much for the thin coating of copper with which the steel was covered. These facts go to show the futility of using any other metal than copper for the construction of gas-heated water appliances if they are to be used in soft water districts, because not only has the metal to withstand the effects of the water, but also of the products of combustion from the gas and the subsequent condensation.

The success of a gas-heated water appliance depends to a large extent on two factors—first, correct advice of the right appliance for the job under consideration, and, secondly, correct fixing. If these considerations are always kept in mind by those concerned with the advising and fixing of these varying types of water appliances, our consumers would be satisfied, and the apparatus itself will be a standing advertisement for the use of gaseous fuel.

Discussion.

Mr. J. H. Canning, O.B.E., J.P., Engineer and Manager of the Newport (Mon.) Gas Company, welcomed the Association to Newport. Referring to the importance of domestic hot water supply as a field for increasing the gas load, he said there were grounds for complete confidence in the face of the severest competition, for their commodity and apparatus were, without question, the best suited to meet the demand of the public for a convenient and plentiful supply of hot water.

The President (Mr. H. S. Bartlett) was glad mention had been made of the necessity for adequate flue termination, made of the right materials and fitted in a proper manner. In some quarters it appeared that inspectors had been appointed for the purpose of examining hot water installations and thus ensuring correct fixing. This applied to work carried out privately, or by the gas undertaking, and the system was to be commended. Lagging was another very important point, and Mr. Bartlett pointed out the remarkable saving effected by efficient insulation of exposed water pipes, which represented ¼d. per week for every foot run of exposed pipes, assuming gas priced at 9d. per therm. He would remind Mr. Robertson that no mention had been made in the paper of the size of pipes and capacity of meter necessary for the proper functioning of hot water appliances.

Mr. Robertson, in reply, observed that makers of ordinary and multi-point geysers usually suggested a 20-light meter, but in small houses where meter accommodation was strictly limited the use of a high capacity standard meter with a small case served the purpose quite well. No less than ⅝ in. compo pipe direct from the meter should be used.

Mr. B. J. Bell (District Superintendent, Cardiff), referring to the trickle heater, questioned why it was that there appeared to be little progress made in popularizing this appliance, which could be fixed so much more cheaply than a circulator or a multi-point geyser. He was of the opinion that if an efficient hot water installation could be provided for the consumer at a figure of about £5, there would be a large market available.

Mr. Robertson fully agreed with Mr. Bell that price was a deciding factor in the sale of domestic hot water appliances. An important factor which contributed to the high cost of fixing any hot water appliance was the local by-laws, which prohibited the fixing of any sealed water appliance direct on to the water supply pipe, but which demanded the providing and fixing a cold water storage tank. The additional cost usually amounted to anything up to £4, and many sales were lost from this cause.

Mr. Bell made a proposition that a letter be addressed to the Senior Association to the effect that some action should be taken in order that modification of by-laws referring to water installations might be made. This was carried unanimously.

The resolution read as follows:

> "That this meeting of the Wales and Monmouthshire Junior Gas Association is of opinion that our water heating business is definitely retarded and sales prevented by the restrictions of water departments' regulations which demand that a tank shall be fixed where sealed water heaters are used."

Mr. Viney (Cardiff) asked if it was possible to obtain any

more business for hot water by advocating the burner under the back boiler of the coal grate.

Mr. ROBERTSON observed that the drawback to this method of heating was its slowness. It was difficult to convince the consumer that the burner which they could see alight under the saddle-back boiler was only burning about 1d. per hour. Another disadvantage was the great heat loss in the grate itself, and also the heavy gauge copper of which the boilers were constructed.

Mr. I. G. JENKINS (Abertillery) remarked that in Abertillery they were permitted to fix "Ascot" heaters direct on to the cold water supply and were thereby saved the cost of a tank.

Mr. CHURCH (Newport) mentioned that at Newport they were compelled under the prevailing by-laws to provide a tank even for the smallest "Ascot" water heater. He observed that the makers stipulated a 12-ft. head of water for "Ascot" heaters. Did Mr. Robertson find that this was necessary? With regard to the discharging of flue pipes from water heaters into the false roof, did Mr. Robertson's remarks in his paper refer to a well ventilated roof?

Mr. ROBERTSON, in reply, remarked that in Cardiff they were under the same obligation regarding a tank for an "Ascot" heater as Mr. Church was in Newport. He stated that he had had experience of installing "Ascot" heaters with a water head of 5 ft. which worked quite successfully. Regarding the discharge of flue pipe into the false roof, Mr. Robertson could not sufficiently emphasize the futility of the practice. One has only to lift the trap, which was usually provided as an entry to the false roof to appreciate this fact, as the draught of air which came downwards through the aperture was usually sufficient to extinguish a lighted candle. No baffler or other device was of any use, and if it was impossible to terminate the flue of the appliance by passing it through a wall to the outside, it was always practical to pass the flue right out through the roof and make good with lead flashing.

Mr. J. F. RUST proposed a vote of thanks to Mr. Robertson. He agreed with the views expressed that the old and antiquated water by-laws at present in operation in a large number of towns seriously prejudiced the sale of gas water heaters, and that steps should be taken by the Gas Industry to get such obstacles removed. He noticed that their electrical friends were not hampered to the same extent.

Mr. J. H. CANNING, Jun., seconded the vote of thanks, which was carried heartily. The Newport Gas Company were thanked for their hospitality by Mr. BELL and Mr. R. T. MILLS. Mr. W. STANFORD replied.

Mid-Southern Utility Company

ANNUAL MEETING

The Annual Meeting of the proprietors of the Mid Southern Utility Company was held at Farnborough on Thursday, Feb. 15, 1934—Mr. R. W. EDWARDS, J.P., C.C., presiding.

The SECRETARY (Mr. F. A. Ricketts) read the notice convening the meeting, and after the minutes of the previous Annual General Meeting held on Feb. 2, 1933, and the Extraordinary General Meeting, held on July 6, 1933, had been confirmed, the Chairman rose to move the adoption of the Directors' Report and Accounts for the year 1933.

The Report was as follows:

After providing for dividends on consolidated preference stock, interest paid to bank and on redeemable mortgage bonds and debenture stock, as well as for the statutory dividends paid for the half-year ended June 30, 1933, the Directors recommend the full statutory dividends of £6 1s.% per annum on the "A" stock; £4 11s.% per annum on the "B" stock; and £5% per annum on the "C" stock, for the latter half of the year—all less income-tax.

The business of the Company generally has been satisfactory, excepting that residuals have been somewhat disappointing. The Water Department met the long drought successfully. It has, however, been decided to reconstruct No. 1 pumping station, and this work will probably take two years. The expense, of course, will largely fall outside of capital.

Mr. A. E. Cutforth, F.C.A. (of Messrs. Deloitte, Plender, Griffiths, & Co.), retires by rotation and is willing to serve again if re-elected.

Mr. B. R. Green is the retiring Director, and, being eligible, offers himself for re-election.

R. W. EDWARDS.
Chairman.

Jan. 29, 1934.

CHAIRMAN'S ADDRESS.

Addressing the proprietors, the CHAIRMAN said:

The Report and Accounts have now been in your possession for some days, and, with your permission, I propose to follow the usual course and take them as read.

ELECTRICITY.

This Department, which at one time was the junior, has now become the senior, and is developing satisfactorily—more so than your Directors can disclose, for obvious reasons. The total advance in sales (for Mid Southern Utility Company) as compared with the year 1932 (excluding consumptions on our various works—which fluctuated) represents 26·6%.

The following apparatus has been fixed during the past year: 28,223 lamps, 92 motors, 916 fires, 166 cooking apparatus, 89 sweepers, 260 irons, and 182 miscellaneous, representing an additional load of 3,720 KW. as compared with 2,960 KW. for the previous year.

It had been anticipated several years ago that with the prospective introduction of the "Grid" supplies it would be necessary to divorce our charges for non-domestic purposes other than lighting, from those for domestic purposes, owing to the form in which the peak-load factor would be introduced into our calculations and the alteration has been applied, and accepted in almost every district, as from Christmas, 1931. This Department, at an early date, must set about writing off its various generating plant displaced by the "Grid," and therefore the anticipated blessings of the National supply may not be so quickly enjoyed.

Very considerable extensions have recently been completed, the financial advantage of which has not been fully reaped. The prospect of further development is good, for a number of schemes are in hand. The somewhat common charge alleged of failing to exercise powers, cannot, I venture to think, prevail against your Company, whose expansion in recent years—even disregarding the progress of our subsidiaries (to which I may refer later)—compares favourably with that of undertakings in other parts of Great Britain.

GAS.

Having spent all my life in the various industries with which I now have the honour to be associated, I think I can claim that with special reference to gas I am one of its oldest members, and I unhesitatingly state my unswerving confidence in its future. One does not care to speak of individual work, but probably I have had a good deal to do with its future prospects. There must be no divisions. I have already stated publicly, the Gas Industry must move in one consolidated mass with full confidence. The inclination to divide into schools of thought and to indulge in selfish feelings will help our competitors in the electrical industry, and while I am just as keen in any industry to which I put my hand, I feel that there should be among our gas friends as great a degree of solidarity as appears to exist on the electricity side.

With regard to the Gas Industry over the past twelve months, one has already had the advantage of hearing eminent gas administrators give their views on the atmospheric conditions. Hitherto, I have gone to the trouble of recapitulating our local records over the year, but to-day I feel that I need not weary you on that point, a summary will be quite sufficient. Everyone knows how beautiful the summer was, and how severe the autumn, and from these facts we can deduce conflicting results, according to the point of view. For instance, one authority, speaking of the climatic conditions of 1933, says: "It has been a gas year"; while another remarks: "It has not been a coke year."

I am not going to lay down any dogma, but I venture to submit that gas, even in beautiful summers, can be sold, and where there is a proper outlet, coke can be disposed of.

Excluding the Company's consumption on various works (and, here, I think it is time I said something more explanatory—namely, that we have during recent years been superseding the use of gas for the generation of electricity owing to the taking of the National "Grid" supplies) we disclose a decrease of ½% for the past year.

Having regard to the circumstances, which have been made so public by more eminent men than myself, I think it is clearly a fairly reasonable result, and so far this year an improvement appears to be indicated.

The climatic conditions, strange to say, after very close analysis, show that as compared with the previous year we had two or three months of substantially lower temperatures, the net average of mean night temperatures for the year 1933 being 41·916° as against 42·375° in 1932.

The following apparatus was added during the year: 558 cookers, 437 fires, and 1,229 water heaters.

The amount received from residuals was disappointing, representing 46·72% of the cost of coal as compared with 48·6% in the previous year—neither of these figures is what I call good. Circumstances are a little different now from what they were when we had a freer hand.

This decrease was influenced largely by the lower price received for coke, and the fact also remains that the manufacturing cost of sulphate of ammonia is still greater than the market price. I am told that judging by present indications both these markets for coke and sulphate will show some improvement in the future, but I prefer to wait for results.

The yield in liquid products (calculated on ammoniacal

liquor of 8 oz. strength) was 48·01 gallons per ton of coal carbonized, as compared with 45·8 gallons for the previous year.

Water.

This department has been satisfactory, and the various plants, reservoirs, and underground works have been well maintained.

You will doubtless have seen in the Directors' report a reference to the proposal to reconstruct No. 1 pumping station over the next two years. I need not say very much on this subject excepting that the decision has been arrived at after mature deliberation, and is a matter we have had under review for some time. It will ultimately contribute to even greater efficiency in this Department.

The total rainfall as recorded by us for the year was 26·685 in. as compared with 26·51 in. for 1932.

The average net domestic consumption per head per day was 14·39 gallons, which, having regard to all the circumstances, reflects the greatest credit on our consumers in their prudent use of water during very dry weather, as well as on the property owners, who attend to the maintenance of the fittings, and on our Inspectors, who are assiduous in their duties.

Capital.

For the three undertakings, the amount of capital authorized is £1,776,367 14s. 2d. Of this there has been received £1,414,780 9s. 7d. Deducting the credit balance of £54,901 2s. 5d. we arrive at the total of £1,359,879 7s. 2d., and allowing for the amount added on consolidation there is a net expenditure of £1,318,889 18s. 11d.

Over the past year, after deducting depreciation of £18,880 17s. 7d. the capital expended was £74,941 5s. 2d.

General.

During the year, other than in our subsidiary undertakings, we added 4,621 consumers in all departments, making a net increase of 22,532 in ten years. I quite anticipate that by the end of the present year the number of consumers (Mid Southern Utility Company) added for the eleven years will approach 30,000—representing, on an average of five persons per household, the population of a very large town.

I wish before closing to refer briefly to one subject. In common with some other large industrial undertakings your Directors have taken steps, and since developed them to some extent, in respect of expansions and what are known as subsidiary undertakings. You will observe from the balance-sheet that only a modest amount is brought into profit and loss, but that is due to the fact that, with one exception, those undertakings we have already acquired, while dividend earning, will not be brought into account until the year 1934. It is, I think, only necessary to add that we are pursuing a very sound and prudent course.

I am pleased to report that our co-partnership scheme continues to give mutual satisfaction. For the year ended June 30, 1933, the bonus was 7·7%, the same as for the previous year. The scheme has now been in operation for about 23 years.

The sports club and the hospital and benevolent fund, in conjunction with the various hospitals and convalescent homes, have done excellent work during the year, respectively for the recreation of the employees and the relief of those who have been ill or injured.

The Directors pay full tribute to the principal officers, and to all the various officials and employees under them, for the devotion and zeal which have been displayed in the execution of their duties.

Generally the outlook is good, and the next few years should very substantially increase and broaden the trading returns of the Company.

In conclusion, I now move the following resolution, which I will ask the Deputy Chairman, Mr. T. A. Braddock, to second:

> "That the Directors' report and statement of accounts for the twelve months ended Dec. 31, 1933, be and are hereby adopted, and that the dividends as therein recommended be and are hereby declared to be payable to the proprietors on March 1."

The resolution was unanimously adopted.

Mr. B. R. Green was re-elected unanimously to the Board, and Mr. Arthur E. Cutforth, F.C.A., as Auditor, and the proceedings terminated with a cordial vote of thanks to the Chairman, Directors and Staff, which Mr. Edwards acknowledged.

Bournemouth Gas and Water Company

ORDINARY GENERAL MEETING

The One Hundred and Thirteenth Ordinary General Meeting of the Bournemouth Gas and Water Company was held at the Offices of the Company, 48, Copthall Avenue, London, E.C., on Friday, Feb. 16—Mr. William Cash (Chairman of the Company) presiding.

The Secretary (Mr. William Cash, Junr.) read the notice convening the Meeting and also the notice convening the Extraordinary General Meeting which was held immediately following the Ordinary General Meeting.

Chairman's Address.

The Chairman: The report and accounts have been circulated, and with your permission we will take them as read, as usual. It falls to me, therefore, to move the first resolution, which is: "That the report and accounts for the year ended Dec. 31, 1933, as presented to this meeting, be received and adopted."

I will take the two departments of the Company's business separately. With regard to gas, there has been no alteration in prices during 1933, but we have in force a scale of discounts for special purposes and for special quantities of gas. That has been operating favourably—as it is meant to do—and to that extent there has been a reduction in the price of gas. Actually there has been a reduction in the price of gas of one-fifth of a penny per 1,000 c.ft. As regards the quantity of gas sold, there has been a decrease during the year. We, in common with other gas undertaking, have had to face a decrease, but it is very small—only 0·44%, or less than ½ of 1%—equivalent to 2½ million c.ft. That is mainly due to the weather which we experienced during 1933, which, as you will all remember, was hot and dry and adverse to the sale of gas for heating and such purposes.

In money, the decrease in receipts amounted to nearly 1%, partly due to the effect of the scale of discounts which I have referred to, and represents £3,867. At the same time, I think you will take comfort in the fact that during the last six months of 1933 there was an increase of 1¾% in the sale of gas, and in the December quarter—you will remember that December was a very cold month—the increase was 5·45%, so that our business is satisfactory and people will use gas as and when they want it. I think, also, there is another factor which comes into the question of the decreased sales of gas, and that is that we are supplying our consumers with more efficient apparatus, which, however, redounds to our advantage in the end.

Residuals have produced more, by £500, and the saving on the tonnage of coal amounts to £4,000. Our distribution expenses, however, are up. Mains repairs show an increase of £4,500, meters £2,600, and cookers £5,100.

An Unusual Honour.

In September last, the British Commercial Gas Association met in Bournemouth. A year ago I told you we had had a visit from the British Waterworks Association, and I had the perhaps rather extraordinary honour of being President of both bodies, and therefore I had to preside at their meetings. I should like to take this opportunity of once more thanking the Bournemouth Corporation for all they did for us to help entertain the very large number of members who came to Bournemouth for the British Commercial Gas Association Conference, which was very successful. We had the satisfaction of having at the dinner the Parliamentary Secretary to the Board of Trade, Dr. Burgin, and he was very kind in the remarks he made both about the Gas Industry in general and the Bournemouth Company in particular. You will see the expenses incurred in connection with the Conference in the accounts; it cost about the same to entertain both Associations.

You will see in the accounts the amounts that have been added to the Special Purposes Fund and the Renewal Fund—viz., £15,868 and £11,016. I invite your attention to the Renewal Fund, which shows a very large debit—which is, of course, what the Renewal Fund is for. During 1933 we had a complete renewal of one of our sets of vertical retorts, which shows that this fund is necessary. There is still left in the fund the sum of £42,000. The receipts so far as gas is concerned were down by £3,491, and the expenses were up by £12,557, so that there is a substantial drop in our profits; but we can bear it.

With regard to water, the receipts are up by £2,994, while the expenses are down under practically every head—maintenance, pumping, and filtration. Here again there is a contribution to the Special Purposes Fund of £5,290 and to the Renewal Fund of £3,672, so that I think I may say that as regards all these provisions for eventualities we have made adequate provision.

Our business is continuing to grow in all directions, and if you look at the Capital Account you will see that the growth of business necessitates the expenditure of considerable sums of money. So far as the gas-works are concerned, there is an item of £9,000 for land. That is in respect of two pieces of land, one for the new showroom in Boscombe, which will be erected in the near future, and the other for land at Bourne Valley which we had the opportunity of acquiring and accordingly bought. The other main capital expenditure in regard to gas has been for a turbo-generator for our electrical plant, and also a steam main between the two works. For water we have had to spend money on new pressure filters at Longham and also a new chloramine house at Alderney, as well as some new water meters.

New Business.

There was other expenditure on new gas mains, meters, cookers, &c. As emphasizing the fact that our business is grow-

ing, I should mention that we obtained 2,198 new gas consumers and added 525 houses to the water supply. There has been an increase of 21¼ miles of gas mains and 4¼ miles of water mains.

Summing up the whole financial position, the combined profits amount to £116,876, which compares with a corresponding figure last year of £125,606. We have put another £5,000 to Reserve, as a year ago. We brought into the accounts the sum of £77,456, and we are carrying forward £74,771. That is a decrease in the carry-forward of £2,685, but it is a very substantial sum to carry forward. It is not far off a year's dividend.

One other item in the accounts is income-tax. You will observe that there is no charge this year for income-tax, and the reason is that our energetic Secretary has been in correspondence and negotiation with the Inland Revenue authorities and has made claims for wear and tear and other matters which will eventuate in a considerable return of tax, so that this year there is no charge on that account. Next year our Secretary has other claims to make, and it is possible we shall be again in the same fortunate position.

Turning to the balance-sheet, I want to emphasize our strong financial position. We are carrying forward £74,771; there is a Reserve Fund of £179,000, a Special Purposes Fund of £105,000, and a Renewal Fund of £42,000. If I add these figures together, we get a total of £400,000, although I do not claim they are all entirely surplus or available. Nevertheless, they do show the strength of the position. On the other side of the account, turning to investments, I find that our Reserve Fund investments stand at £130,287, but they were worth £154,000 on Dec. 31 last. That is an increase of some £24,000, and the Special Purposes Fund investments also show a surplus on the same basis of £6,000. The Pension Fund investments—which, of course, are not ours but belong to the Trustees—stand at £257,000, but are worth £299,000—an increase of £42,000—so that our investments show a total improvement of £72,000 as compared with the figures they stand at in the accounts, which is a very satisfactory state of affairs.

There are two other matters mentioned in the report on which I should like to say a word or two. First, with regard to the new showroom at Boscombe. For years we have been working with a small and inefficient showroom there. It is very difficult to get adequate premises, but we have now bought a piece of land at considerable cost on which we propose to build a really modern and up-to-date showroom for that part of the district.

Proposed Acquisition of Two Undertakings.

Reference is also made to the negotiations with the Lymington and Ringwood Companies—two small Companies outside our present area. We had hoped to be able to tell you that these were farther advanced than they in fact are, but the delay has not been entirely our own fault. Some difficulty has arisen with regard to the Board of Trade, which seems to feel some hesitation in making an Order in respect of a limited liability company having regard to its technical position under the limited liability Acts. I am, however, happy to tell you that we have received information this morning that the Board of Trade is prepared to consider making an Order and that the matter may go forward at once, which it will do without further delay. We thought you ought to know about these negotiations and hence the paragraph about them in the report.

The terms between the Bournemouth Company and these other two Companies are agreed, and later on you will be asked to confirm the prosecution of the necessary Order. When it is obtained I am quite sure that the consumers in these areas will undoubtedly reap an advantage through the supply being in the hands of a larger and more powerful Company, and that is not saying anything against the two existing Companies, which, although small, are exceedingly well managed. Nevertheless, I believe that the shareholders, the consumers, and the Company will benefit from the amalgamation.

Perhaps you will expect me to say something about gas and electricity. Our electrical friends, of course, are faced with the necessity for finding business for the very large expenditure that has been incurred on the electricity Grid, amounting to some £32,500,000, but I think I may tell you that we are holding our own. I have told you in past years what the effect of the competition between gas and electricity in Bournemouth is as regards new houses, and I have told you about the number of houses that are piped only, those that are piped and wired, and those that are wired for electricity only. Last year the number of houses that were wired only has doubled. That may sound very serious, but when we come to the actual figures, they number two during the year as against one the previous year! The number of houses that are piped only is 320 and the number piped and wired is 1,118, so that I think you will see we are holding our own.

In this connection I was very struck the other day by a thing that has been done in Bournemouth in connection with the very fine new building of the *Bournemouth Echo*. I should like to take the opportunity of congratulating the Chairman and Directors of that Company for the very fine building they have put up and the very satisfactory fact, from our point of view, that the hot water supply throughout that building is entirely by gas; the heating of the whole of the place is afforded by four gas-fired boilers. They have the very latest ideas in panel heating, and they are continuing in their new building what they did in the old building, and that is to supply all the heat required in their type foundry by means of gas. That is surely an example that in spite of keen competition we are able to hold our own.

One other matter that I should like to mention is that we have been very carefully watching our water charges. We have told the Corporation that when the time came we would endeavour to bring our charges down. We have no charges for extras in Bournemouth and our charge is only 5% of the rateable value, which is a very low rateable charge. The Ministry of Health gave us powers in 1921 to add 33⅓% to our pre-war charges, but we have lately been reducing our charges, and the addition over the pre-war charge is now only 10%. Further, I am happy to tell you and the Corporation that from June next we propose to reduce that extra 10% to 5%. The only thing that has made us hesitate at all is the fact that we shall experience a substantial increase in our own assessments, which means that we shall have to pay more for rates, and in that sense we have to look at the whole aspect of our water undertaking as to whether we can afford to do this. The Directors would like to do it, and they have come to the conclusion that they can do it as from June.

I should also like to say a word or two about water supply generally, because there has been so much correspondence and debate in the Press and in the House of Commons and elsewhere on this question of water supply. It falls under several heads. First, there is the question of adequacy which is, of course, rather in our minds at the present time having regard to the discussion that has taken place concerning rural supplies as a result of the period of drought we have experienced. Then there is the question of town supplies and a suggested water Grid, on the lines of the electricity Grid, but I do not propose to elaborate that aspect. I would, however, like to say a word about our own supply in Bournemouth. As regards quality, we are perfectly satisfied. It is excellent both as judged by our own tests and the tests which, quite properly, are regularly made by the local authority. With regard to adequacy, there was no question of this, so far as our supply was concerned in 1933, in spite of the abnormal and long-continued dry weather. At our total maximum quantity we never had more than one-quarter of the minimum river flow from which our supply is taken. The maximum week's demand during 1933 was 21% more than in 1932, which is a very large addition, and that was due to a variety of causes; the dry, hot weather, garden watering, and also to the fact that Bournemouth was very busy during August.

Rural Water Supply.

With regard to rural water supplies, we cover both a rural and an urban area, and we cater for the demands fairly completely as far as I have been able to ascertain in both areas. No rural area was without water so far as we were concerned, and if any rural area did not get a sufficient supply it cannot be said that it was in any way the fault of the Company. For instance, I saw a statement in the Press that the village of Holdenhurst (Bournemouth) had to get the Bournemouth Corporation water carts to bring supplies of water, and I would not have mentioned this but for the fact that some people might have thought this case had reference to the Bournemouth Gas and Water Company. Actually this village was in the area of another water company, but I understand that this Company had laid a main to Holdenhurst some six months ago and that it would have been an easy matter to connect up the supply, but the fact was that there seems to be a reluctance to pay a water rate.

Moreover, that is not a unique experience in other districts, and this question of rural water supplies is really almost entirely a matter of finance. From the point of view of a water supply authority let me give you an instance. Assume it is necessary to supply a small community, and you have to lay a mile of 4-in. main costing £750. It is not unreasonable—indeed, Parliament has sanctioned it—to expect a return of 12½% on the capital outlay. That would mean in such a case a sum of £93 15s. The first charge would be of interest of 5% on the amount, leaving 7½% to pay for the supply of water, depreciation, repairs, renewals of pipes, maintenance, supervision, rates, taxes, and interest on the head works. Assuming the cottages are rated at £10 per annum, which is not unusual, it means that each house would pay 14s. 4d. per annum and to give us the £93 15s., we should have to have 130 houses on that mile of main, or one every 30 yards on both sides of the road.

These are not the cases which have been calling out for water supplies. The trouble is where you have scattered houses built some distance from the road, perhaps on the top of a hill, and so on. There comes a period of drought and naturally there is an outcry. You know what has been said in the House of Commons; the Minister of Health has said that he is prepared now to provide a sum of money, but—and very properly, if I may say so—this money is to be used for those who help themselves, through the medium of such further help from the county councils who are now authorized to assist in these rural areas, and if the people are prepared to pay a water rate.

There is one other aspect of the case that is sometimes overlooked. No sooner is a water supply given in such rural areas than the question of sewerage has to be dealt with. A water supply must be followed sooner or later by sewerage, and that is accompanied by heavy expense. Therefore, I repeat that in this matter the question of finance is really the pre-eminent and difficult question which will have to be faced by whoever starts to tackle this problem where a supply is really asked for.

Sir Charles L. Morgan (Deputy-Chairman) seconded the motion for the adoption of the report and accounts, and it was carried unanimously.

Dividends.

The Chairman then moved the resolution recommending the payment of the dividends on the 6% preference stock, the 7%

maximum dividend stock, and 9½% on the standard 5% (sliding-scale) stock.

Sir JOHN WITHERS seconded, and the motion was carried.

RE-ELECTIONS.

The CHAIRMAN, moving the re-election of Lieut.-Col. Harold W. Woodall as a Director of the Company, explained that Col. Woodall was unable to be present as he was on a trip to Australia and New Zealand where his presence was urgently needed on important business matters.

Sir GEORGE JESSEL seconded his re-election, which was carried unanimously.

The retiring Auditor (Mr. W. B. Paton) was also re-appointed.

This closed the business of the Ordinary General Meeting.

EXTRAORDINARY GENERAL MEETING.

An Extraordinary General Meeting followed immediately, and Mr. W. Cash again presided.

The CHAIRMAN, in moving the two resolutions set out below, said the object was to authorize the Directors to issue additional capital from time to time in such form as they thought fit. The Directors would take advantage of the market position and decide whether to issue sliding-scale stock, maximum dividend stock, or preference stock. The shareholders had always trusted the Board in this respect hitherto, and he hoped they would do so again. With regard to new preference stock that would not be issued at a higher rate than 6%, because that was the rate which Parliament had fixed as the maximum. The second resolution authorized the Directors to issue the respective loan capital in regard to such stock as was issued.

He therefore proposed resolutions:

1. Authorizing the Directors to raise additional capital in accordance with the provisions of Section 9 of the Bournemouth Gas and Water Act, 1928, by the creation and issue of £100,000 stock, either in new standard 5% (sliding-scale) stock (carrying a standard rate of dividend of 5% per annum) with sliding-scale of dividend, or new maximum dividend (7%) stock, or new preference stock, or wholly or partially by one or more of those modes respectively limited as to the new maximum dividend stock, as to dividend in any one year to the sum of £7, and as to the new preference stock, to £6 respectively for every £100 actually paid up on such stock, exclusive of any sum paid by way of premium.
2. Authorizing the Directors to exercise the borrowing powers of the Company under the provisions of Section 13 of the Bournemouth Gas and Water Act, 1928, by the creation and issue of irredeemable debenture stock to an amount not exceeding £50,000, and that such debenture stock be issued at such times, in such amounts and manner, on such terms and conditions, and with such rights and privileges as the Directors shall think fit.

Sir CHARLES L. MORGAN seconded the resolutions, and they were unanimously adopted.

VOTES OF THANKS.

The CHAIRMAN proposed a vote of thanks to the Engineer and General Manager, the Secretary, and staff and workpeople, and expressed the appreciation of the Board of the loyal services rendered by all. Speaking with regard to Mr. Moon, he referred to his special chemical knowledge and the fact that the Company had, under Mr. Moon's direction, started to manufacture benzole. He included in the vote of thanks the staff in London.

Mr. P. G. G. MOON acknowledged the vote of thanks, pointing out that the whole staff worked in the manner they did because of the enlightened policy of the Board. With the treatment they received at the hands of the Directors the staff could not do otherwise than give the most loyal service. Continuing Mr. Moon took the opportunity of thanking the Chairman very sincerely for the able and efficient manner in which he had presided over the meetings of the British Commercial Gas Association in Bournemouth last year. The Chairman had said a little about it, but it should be made very clear that the success of that Conference was largely due to the personality and able leadership of Mr. Cash. There were present at that Conference representatives from Canada, Australia, France, and far-off Japan, and everybody was impressed very much by the personality of Mr. Cash and by the obvious fact that he was completely master of his subject. The whole of the Gas Industry was under a debt of gratitude to Mr. Cash for what he had done on that occasion.

The CHAIRMAN remarked that whatever he himself had been able to do in connection with the British Commercial Gas Association Conference in Bournemouth, it must not be overlooked what magnificent staff work was carried out by Mr. Moon and his assistants.

The Meeting closed with a vote of thanks to the Chairman and Directors.

Gas Companies' Results in 1933

Bath.

The annual report of the Bath Gas Company states that their new areas of Chippenham and Corsham are now supplied with gas from the Bath Works, a 12-in. main having been laid from Box to Corsham and Chippenham, and the manufacture of gas has ceased at Corsham and Chippenham. Premises in Old Bond Street, Quiet Street, Queen Street, and Trim Street have been reconstructed for chief offices, showrooms, and distribution department, and were officially opened by Dr. Burgin, M.P., Parliamentary Secretary to the Board of Trade, on Jan. 22, 1934. A dividend at the rate of 5% per annum, less income-tax, was paid in August last for the half-year to June 30, 1933, and the Directors recommend the declaration of a dividend at the same rate, less income-tax, for the half-year ended Dec. 31, 1933.

Scarborough.

The price of gas during the whole year has been less than the basic rate of 9·2d. per therm; therefore, in accordance with the Scarborough Gas (Consolidation) Act, 1927, the Directors recommend that the dividend for the year on the ordinary stocks be increased from 5% to 6%, which will account for £2,361, that £76 be carried to the reserve fund account, and that the total of these two amounts, £2,438, be placed to the profit-sharing scheme; this amount being one-sixth of £14,632, which was the "Consumers' Benefit" for the year. The balance standing at credit of net revenue, after taking into account interest charges, interim dividend, &c., is £16,058, and, after providing for final dividend, &c., there remains a balance of £3,432 10s. 9d. to carry forward. The statutory interim dividends of 2½% on the preference and ordinary stocks were paid in August last, and the final dividends of 2½% on the preference stocks and 3½% on the ordinary stocks will be payable on and after Feb. 23, 1934. The sale of gas during the year showed a slight decrease of 1·5%, incurred during the first half of the year. The quantity sold was 632 million c.ft. (2,847,279 therms) as compared with 642 million c.ft. (2,891,483 therms) for the previous year.

Shanklin.

The Directors of the Shanklin and Ventnor Gas Company submit a report for the year ended Dec. 31, 1933, which states that the balance standing to the credit of the profit and loss account is £11,907 after payment of an interim dividend of 4% *less* income-tax. The Directors recommend the declaration of a final dividend of 4% for the half-year, making 8% for the year *less* income-tax. This is the first complete Report of the combined Shanklin and Ventnor Undertakings. Considerable extensions and enlargements of plant have been made, and a seven years' public lighting contract with the Ventnor Urban District Council has been secured for Wroxall. After 53 years of untiring zeal, the Manager, Mr. Taylor, is retiring on April 30 next. Mr. Leslie Payne, M.Inst.Gas E., has been appointed as his successor.

Weston-super-Mare.

Owing to the abnormally warm summer, a considerable reduction in the sale of gas by the Weston-super-Mare Gaslight Company occurred, which was not entirely made up in the remaining months of the year. The total sales amounted to over 416 million c.ft., which was a reduction of 0·95% compared with the record year of 1932. Agreements for the purchase of the Cheddar Gas Company, Ltd., the Burnham Gas Company, Ltd., and the Highbridge Gas Company, Ltd., have been made, and applications have been sent in to the Board of Trade for the necessary Special Orders to confirm the agreements to extend the Company's statutory area of supply, and for other specified purposes. The Company's mains have been extended during the year. The Directors recommend the payment of the maximum dividend of 5% on the ordinary stock, the dividend of 6% on the 6% redeemable preference stock, and the dividend of 5% on the 5% preference stock for the half-year ended Dec. 31, 1933, all less income-tax.

Yorktown.

The gross profit for the year in respect of the combined Undertaking of the Yorktown (Camberley) and District Gas and Electricity Company amounts to £21,963, and the profit and loss account shows that after providing for debenture and other interests, dividends on preference stock for the year 1933, and the dividend at the rate of 6½% per annum less tax on the consolidated ordinary stock for the half-year to June 30, 1933, there is a balance of £13,857 available for dividends. The Directors accordingly recommend that dividends at the following rates be declared for the half-year ended Dec. 31, 1933: 5% per annum on the consolidated preference stock, and 6½% per annum on the consolidated ordinary stock, both less income-tax. The ordinary dividend will absorb £3132 in addition to the preference dividend already provided for, leaving £10,725 to be carried forward to the next account. The business of the Company continues to be satisfactory. The sale of gas shows a small decrease of 0·40% as compared with 1932. Revenue from the sale of residuals is approximately the same as last year.

GAS MARKETS & MANUFACTURES

Stock Market Report.

[For Stock and Share List, see later page.]

The chief feature on the Stock Exchange last week was the renewal of strength in gilt-edged and other high-class investment securities, and prices responded accordingly. The recent dividend announcements also brought activity to the Home Rail market, particularly in the Southern stocks. In the Industrial section attention was more or less confined to the leaders, including Imperial Chemicals, Dunlops, Imperial, and British American Tobacco shares, the £1 units of the latter two Companies reaching the £6 mark.

In common with other high-class securities, Gas stocks and shares were well supported and a large proportion of the business done was recorded at top prices. Alliance and Dublin headed the list of gains with a rise of 3½ to 130½, at which price the yield works out at £5 7s. 4d.% on a 7% dividend. The low price is doubtless due to the uncertainties which exist as to the possible trend of events in Ireland, but as the Company's revenue from gas has been well maintained, there would appear every justification for some further improvement in the value of the stock, which is attractive at the current price. Bombay £1 shares hardened 6d. to 27s. 6d., and at the local exchange Newcastle and Gateshead units gained 3d. to 26s. 3d. This Company's stocks are also quoted on the London Exchange, where the popularity of the £1 units is indicated by a price of 26s., or only 3d. below that on the local exchange, and business was recorded in London at this price last week. Newport (Mon.) 5% maximum rose 1½ to 104 on the Bristol Exchange, and here again the yield is attractive at £4 16s. 1d.%, although the stock is closely held, and a standing order may be necessary to procure a holding. The same can also be said of Portsmouth 5% maximum, which at the present price of 104½ on the London Exchange appears to be rather undervalued.

[Correction: In last week's Stock and Share List the quotation of Plymouth and Stonehouse ordinary should have been marked 165-170, not 169-174, and that of Portsmouth ordinary 169-174, not 165-170.]

Current Sales of Gas Products.

The London Market for Tar Products.

LONDON, *Feb.* 19.

There are no changes to report in the tar products market. Current prices are as follows:

Pitch is 57s. 6d. to 60s. per ton f.o.b.

Creosote, 3d. to 3¼d. per gallon.

Refined tar, 4d. to 4¼d. per gallon in bulk at makers' works.

Pure toluole, about 8s.; pure benzole, 1s. 10d. to 1s. 11d.; 95/160 solvent naphtha, about 1s. 9d.; and 90/140 pyridine bases, about 6s.—all per gallon naked at makers' works.

Tar Products in the Provinces.

Feb. 19.

The average prices of gas-works products during the week were: Gas-works tar, 24s. to 29s. Pitch—East Coast, 59s. to 61s. 6d. f.o.b. West Coast—Manchester, Liverpool, Clyde, 59s. to 61s. 6d.* Toluole, naked, North, 2s. 3½d. to 2s. 5½d. Coal-tar crude naphtha, in bulk, North, 6½d. to 6¾d. Solvent naphtha, naked, North, 1s. 6½d. to 1s. 7½d. Heavy naphtha, North, 10½d. to 11d. Creosote, *ex* works, in bulk, North, liquid and salty, 2½d. to 2¾d.; low gravity, 2d. to 2½d.; Scotland, 2½d. to 2¾d. Heavy oils, in bulk, North, 3¾d. to 4¼d. Carbolic acid, 60's, 2s. 1½d. to 2s. 2½d. Naphthalene, £10 to £11. Salts, 55s. to 75s., bags included. Anthracene, "A" quality, 2½d. to 3d. per minimum 40%, purely nominal; "B" quality, unsalable.

* All prices for pitch are now quoted on the basis of f.o.b. In order to arrive at the f.a.s. value at any port it will be necessary to deduct the loading costs and the tolls whatever they may be.

Tar Products in Scotland.

GLASGOW, *Feb.* 17.

A fair volume of business has been transacted during the week, and prices are well maintained.

Crude gas-works tar.—The actual value is 35s. to 37s. per ton *ex* works.

Pitch.—Export value is nominal at 50s. per ton f.o.b. Glasgow. In the home market small quantities command round 50s. per ton *ex* works in bulk.

Refined tar is still offered at 3¼d. to 3¾d. per gallon f.o.r. in buyers' packages.

Creosote oil.—Prices are steady. B.E.S.A. specification is 4d. to 4¼d. per gallon; low gravity, 4d. to 4¼d. per gallon; and neutral oil, 4d. to 4¼d. per gallon—all in bulk *ex* works.

Cresylic acid.—There is little movement, but values are unchanged. Pale, 97/99%, is 1s. 1d. to 1s. 2d. per gallon; dark, 97/99%, 11d. to 1s. per gallon; and pale, 99/100%, 1s. 4d. to 1s. 5d. per gallon—all f.o.r. in buyers' packages.

Crude naphtha is commanding 4¾d. to 5¼d. per gallon, according to quality and quantity.

Solvent naphtha.—90/160 is easier at 1s. 5d. to 1s. 6d. per gallon, while 90/190 is now offered at 10d. to 11d. per gallon.

Motor benzole is only available in small quantities at 1s. 7d. per gallon *ex* works.

Pyridines.—90/160 grade is 4s. 3d. to 4s. 6d. per gallon, and 90/140 grade is 4s. 9d. to 5s. 3d. per gallon.

Benzole Prices.

These are considered to be the market prices for benzole at the present time:

	s. d.		s. d.	
Crude benzole . . .	0 10	to	0 10¾	per gallon at works
Motor ,, . . .	1 5	,,	1 5½	,, ,, ,,
90% ,, . . .	1 5½	,,	1 6	,, ,, ,,
Pure ,, . . .	1 8½	,,	1 9	,, ,, ,,

Contracts Advertised To-Day.

Coal.

Milford Haven Urban District Council. [p. 507.]

Conveying, Screening, and Storage Plant.

St. Helens Corporation. [p. 508.]

Gasholder Removal.

Chorley Gas Department. [p. 507.]

Retorts, &c.

St. Helens Corporation. [p. 508.]

Trade Notes.

Daniel Adamson & Co., Ltd.

This firm has taken over the goodwill, drawings, and patterns of the boiler section of the business of Messrs. Galloways, Ltd., including also the section of the business embodying mild-steel riveted and welded tanks and other plating works.

Ewart & Son, Ltd.

Many difficulties and general adverse trading conditions have had to be faced by Messrs. Ewart & Son, Ltd., of 350, Euston Road, N.W. 1, during 1933. In presenting the balance-sheet and profit and loss account for 1933 the Directors are pleased to be able to report that the trading of the Company has been fully maintained, and that after making full provision for all bad and doubtful debts and contingencies, the net profit earned amounts to £35,418, and is available for distribution. To this falls to be added £9.042, the amount brought forward from last year, making a total of £44,460.

The Directors recommend that the payment of the preference dividend of 16% for the year (less income-tax) be confirmed, and a dividend of 20% on the ordinary shares for the year be declared and paid (less income-tax). This leaves a balance of £12,474 to be carried forward.

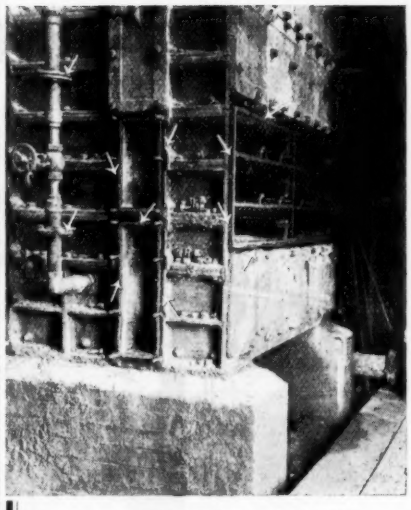
The Company's factories and plant have been maintained in good and efficient condition, and the Company's name for high-quality manufacture has been upheld and is still fully maintained in this its centenary year.

STOCK AND SHARE LIST.

Official Quotations on the London and Provincial Stock Exchanges.

Issue. £	Share.	When ex-Dividend.	Dividends. Prev. Hf. Yr. % p.a.	Dividends. Last Hf. Yr. % p.a.	NAME.	Quotations. Feb. 17. (Provincial Exchanges Feb. 16.)	Rise or Fall on Week.	Transactions. Lowest and Highest Prices During the Week.
1,551,868	Stk.	Oct. 9	7	7	Alliance & Dublin Ord. ...	128–133	+3½	132–132⅞
374,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb. ...	90–100	...	94½
557,655	,,	Aug. 28	7	7	Barnet Ord. 7 p.c.	167–172	...	170
300,000	1	Oct. 23	1/9⅔	1/4⅔	Bombay, Ltd.	26/6–28/6	+·/6	27/10½–29/4½
178,480	Stk.	Aug. 14	9½	9½	Bournemouth sliding scale	195–205	...	202–205
550,050	,,	,,	7	7	Do. 7 p.c. max. ...	163–168	...	166–167½
439,160	,,	,,	6	6	Do. 6 p.c. Pref. ...	138–143	...	...
50,000	,,	Dec. 18	3	3	Do. 3 p.c. Deb. ...	75–80	...	...
262,025	,,	,,	4	4	Do. 4 p.c. Deb. ...	100–105	...	...
335,000	,,	,,	5	5	Do. 5 p.c. Deb. ...	120–125	...	123½
357,900	,,	Aug. 28	7½	7½	Brighton, &c., 6 p.c. Con. ...	164–169	+1	168½
540,000	,,	,,	6⅔	6⅔	Do. 5 p.c. Con. ...	151–156	...	154
195,500	,,	,,	6	6	Do. 6 p.c. B. Pref.	136–141	...	...
1,487,500	,,	July 24	5	5	Bristol 5 p.c. max.	117–118*a*	–1	...
120,420	,,	Dec. 18	4	4	Do. 1st 4 p.c. Deb. ...	100–102*	...	...
217,870	,,	,,	4	4	Do. 2nd 4 p.c. Deb. ...	100–102*a*	...	...
328,790	,,	,,	5	5	Do. 5 p.c. Deb.	120–123*a*	...	...
855,000	,,	Sept. 25	8	7	British Ord.	155–160	...	157–158½
100,000	,,	Dec. 18	7	7	Do. 7 p.c. Pref.	151–156	...	...
350,000	,,	,,	5½	1⅛	Do. 5½ p.c. Pref.	106–111	...	...
120,000	,,	,,	4	4	Do. 4 p.c. Red. Deb. ...	95–100	...	...
450,000	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	107–112	...	...
160,000	,,	Jan. 8	5	5	Cambridge 5 p.c. Deb. ...	113–118	...	...
100,000	10	May 22	6	4	Cape Town, Ltd.	5⅛–6⅛	...	...
100,000	10	Nov. 6	4½	4½	Do. 4½ p.c. Pref. ...	6¾–7¾	...	...
150,000	Stk.	Dec. 18	4½	4½	Do. 4½ p.c. Deb. ...	95–100	...	...
626,860	,,	July 24	6	6	Cardiff Con. Ord.	123–128	...	...
237,860	,,	Jan. 8	5	5	Do. 5 p.c. Red. Deb.	103–108	...	...
157,150	,,	Aug. 14	6⅛	5	Chester 5 p.c. Ord.	115–125*b*	...	...
98,936	1	Oct. 9	2/-	2/-	Colombo, Ltd. Ord.	1⅞–1⅞	...	...
24,500	1	,,	1/4⅛	1/4⅛	Do. 7 p.c. Pref. ...	19/-–21/-	...	...
609,204	1	Oct. 9	/11'48	/11'48	Colonial Gas Assn. Ltd. Ord.	1⅛–1⅛	...	...
296,053	1	,,	1/8'30	1/8'30	Do. 8 p.c. Pref.	23/-–25/-	...	...
1,775,005	Stk.	July 24	6⅔	5	Commercial Ord.	122–127	...	124⅛–125⅞
475,000	,,	Dec. 18	3	3	Do. 3 p.c. Deb. ...	74–79	...	...
286,344	,,	,,	—	5	Do. 5 p.c. Deb. ...	121–126	...	...
807,560	,,	Aug. 14	7	7	Croydon sliding scale ...	153–158	...	155–156
569,590	,,	,,	5	5	Do. max. div.	105–110	...	...
620,385	,,	Jan. 8	5	5	Do. 5 p.c. Deb.... ...	120–125	...	...
542,270	,,	Aug. 14	10	7	Derby Con.	170–180*c*	...	...
55,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb.	98–100*c*	...	...
209,000	,,	Aug. 28	5	5	East Hull Ord. 5 p.c. ...	108–113	...	108
179,500	,,	Aug. 28	6	6	East Surrey Ord. 5 p.c. ...	128–133	...	128–129
155,019	,,	Dec. 18	5	5	Do. 5 p.c. Deb. ...	115–120	...	119
1,002,180	,,	Sept. 25	†7	†5	European, Ltd.	125–135	...	126–128
19,342,763	,,	Aug. 14	5⅜	5⅜	Gas Light & Coke 4 p.c. Ord.	26/6–27/6*f*	...	26/1½–26/10½
2,600,000	,,	,,	3½	3½	Do. 3½ p.c. max.	87–90	...	90
4,477,106	,,	,,	4	4	Do. 4 p.c. Con. Pref. ...	103–106	...	105–106
6,109,497	,,	Dec. 18	3	3	Do. 3 p.c. Con. Deb. ...	82–85	...	83½–85
3,642,770	,,	,,	5	5	Do. 5 p.c. Red. Deb. ...	114–117	...	115⅝–117
3,500,000	,,	,,	4½	4½	Do. 4½ p.c. Red. Deb. ...	113–116	...	114–114⅜
270,466	,,	Aug. 28	6	6	Harrogate New Cons. ...	120–125	...	...
82,500	,,	Aug. 28	7	7	Hastings & St. L. 5 p.c. Conv.	149–154	...	...
958,740	,,	,,	5⅜	5⅜	Do. 3½ p.c. Conv.	117–122	...	...
140,000	1	Oct. 9	†10	1/7½	Hongkong & China, Ltd. ...	29/-–32/-	...	...
213,200	Stk.	Aug. 14	6	6	Hornsey Con. 3½ p.c. ...	130–135	...	...
5,600,000	,,	Nov. 6	14	10	Imperial Continental Cap.	205–215	...	205–212
223,130	,,	Feb. 5	3½	3½	Do. 3½ p.c. Red. Deb.	89–94*	...	92½
235,242	,,	Aug. 14	8⅛	8⅛	Lea Bridge 5 p.c. Ord. ...	172–177	...	...
2,145,907	,,	Aug. 14	6	6	Liverpool 5 p.c. Ord. ...	132–134*b*	+½	...
245,500	,,	Dec. 18	5	5	Do 5 p.c. Red. Pref. ...	101–111*b*	...	...
806,083	,,	July 17	4	4	Do. 4 p.c. Deb. ...	100½–102½*b*	...	...
165,736	,,	Aug. 28	10	8	Maidstone 5 p.c. Cap. ...	180–190	...	...
56,176	,,	Jan. 8	8	8	Do. 3 p.c. Deb. ...	72–77	...	75
75,000	5	Dec. 4	†10	†10	Malta & Mediterranean ...	9–11	...	...
393,000	—	Oct. 2	5½	5½	Metropolitan (of Melbourne) 5½ p.c. Red. Deb.	98–103	...	...
231,978	Stk.	Aug. 28	5	5	M. S. Utility "C." Cons. ...	111–116	...	...
818,657	,,	,,	4	4	Do. 4 p.c. Cons. Pref.	95–100	...	...
360,075	,,	Jan. 8	4	4	Do. 4 p.c. Deb. ...	100–105	...	...
148,955	,,	,,	5	†5	Do. 5 p.c. Deb. ...	117–122	...	...
675,000	,,	21 May '31	†6	6	Montevideo, Ltd.	60–70	...	64–65⅞
2,061,315	,,	Aug. 14	5⅔	5	Newcastle & Gateshead Con.	26/-–26/6*d*	+·/3	...
682,856	,,	,,	4	4	Do. 4 p.c. Pref. ...	101–102*d*	–½	...
776,706	,,	Jan. 8	3½	3½	Do. 3½ p.c. Deb. ...	90¾–91¾*d*	...	...
277,285	,,	Nov. 6	5	5	Do. 5 p.c. Deb. '43 ...	105–107*d*	...	...
274,000	,,	Aug. 14	5	5	Newport (Mon.) 5 p.c. max.	103–105*a*	+1½	...
204,940	,,	Aug. 28	7½	7½	North Middlesex 6 p.c. Con.	157–162	...	...
396,160	,,	Feb. 5	5	5	Northampton 5 p.c. max. ...	99–104*	...	...
300,000	,,	Dec. 4	7	†9	Oriental, Ltd.	147–152	...	...
316,617	,,	Dec. 18	8	8	Plym'th & Stonehouse 5 p.c.	165–170	...	168–169
504,416	,,	Aug. 28	8	8	Portsm'th Con. Stk. 4 p.c. Std	169–174	...	...
241,446	,,	,,	5	5	Do. 5 p.c. max. ...	102–107	...	...
114,000	,,	Aug. 14	5	5	Preston 5 p.c. Pref.	105–110	...	...
686,312	,,	Jan. 22	4	4	Primitiva 4 p.c. Rd. Db. 1911	87–92	...	83⅞–90
389,813	,,	Dec. 18	4	4	Do. 4 p.c. Cons. Deb.	88–93	...	...
150,000	10	Sept. 25	6	6	San Paulo 6 p.c. Pref. ...	6¾–7¾	...	...
1,736,968	Stk.	Sept. 11	6	6	Sheffield Cons.	135–137*e*	...	...
95,000	,,	Jan. 8	4	4	Do. 4 p.c. Deb.	90–94*e*	...	...
133,201	,,	Sept. 11	5	8½	Shrewsbury 5 p.c. Ord. ...	137–142	...	144½
90,000	10	June 12	†5	†4	South African	3–5	...	...
6,709,895	Stk.	Aug. 14	7	5	South Met. Ord.	135–138	...	133–136⅞
1,135,812	,,	,,	6	6	Do. 6 p.c. Irred. Pf.	138–143	...	...
850,000	,,	,,	20/-*g*	4	Do. 4 p.c. Irred. Pf.	102–106	+½	101
1,895,445	,,	Jan. 8	3	3	Do. 3 p.c. Deb. ...	80–83	...	82½–83⅞
1 000,000	,,	Jan. 22	5	5	Do. 5 p.c. Red. Deb.	111–115	...	113½–115
209,820	,,	Aug. 14	8⅓	8⅓	South Shields Con.	170–171*d*	...	...
1,543,795	,,	Aug. 14	6	6	South Suburban Ord. 5 p.c.	132–137	+1	135–137
512,825	,,	,,	5	5	Do. 5 p.c. Pref.	114–119	...	118–119
300,000	,,	,,	—	4	Do. 4 p.c. Pref.	100–103	...	...
868,837	,,	Dec. 18	5	5	Do. 5 p.c. Deb.	120–125	...	123
100,000	,,	,,	4	4	Do. 4 p.c. Deb.	100–103	...	...
647,740	,,	Aug. 28	5	5	Southampt'n Ord. 5 p.c. max.	111–116	+1	...
121,275	,,	Dec. 18	4	4	Do. 4 p.c. Deb.	97–102	...	...
350,000	,,	Aug. 28	5⅓	5⅓	Swansea 5⅓ p.c. Red. Pref.	108–113	...	...
200,000	,,	Dec. 18	6⅓	6⅓	Do. 6⅓ p.c. Red. Deb.	103–108	...	...
1,076,490	,,	Aug. 14	6⅔	6⅔	Tottenham and District Ord.	150–155	...	152
300,000	,,	,,	5⅓	5⅓	Do. 5⅓ p.c. Pref. ...	125–130	...	...
62,235	,,	,,	5	5	Do. 5 p.c. Pref. ...	112–117	...	...
199,005	,,	Dec. 18	4	4	Do. 4 p.c. Deb. ...	97–102	...	100½
85,701	,,	Oct. 9	6	6	Tuscan, Ltd. 6 p.c. Red. Db.	90–100	...	...
349,110	,,	Aug. 28	7	7	Uxbridge, &c., 5 p.c. ...	149–154	...	...
88,330	,,	,,	5	5	Do. 5 p.c. Pref. ...	112–117	...	...
1,322,220	,,	July 10	7	7	Wandsworth Consolidated	155–160	...	155½–160
1,096,373	,,	,,	5	5	Do. 5 p.c. Pref.	119–124	...	121½–123½
1,317,964	,,	Dec. 18	5	5	Do. 5 p.c. Deb.	120–125	...	123½–124½
158,400	,,	Aug. 28	6*h*	5	Winchester W. & G. 5 p.c. Con.	115–120	...	...

Quotations at:—*a.*—Bristol. *b.*—Liverpool. *c.*—Nottingham. *d.*—Newcastle. *e.*—Sheffield. *f.*—The quotation is per £1 of stock. *g.*—For quarter. *h.*—Paid £3, including 10s. on account of back dividends. *i.*—The interest due 1/9/33 was paid on that date. * Ex. div. † Paid free of income-tax. ‡ For year. Hongkong & China, Ltd.—paid on £10 shares.



The arrows show "Permac" joints.

Every Joint sound

This photograph shows joints on a Coke Oven Plant. "Permac," the Metal-to-Metal Jointing Material, is used for all Joints in this Works. All over the country it is used successfully in similar severe conditions. It stands up to all temperatures and pressures, and is equally successful on every kind of joint—steam, gas, oil, by-product.

Permac
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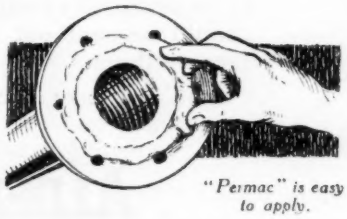

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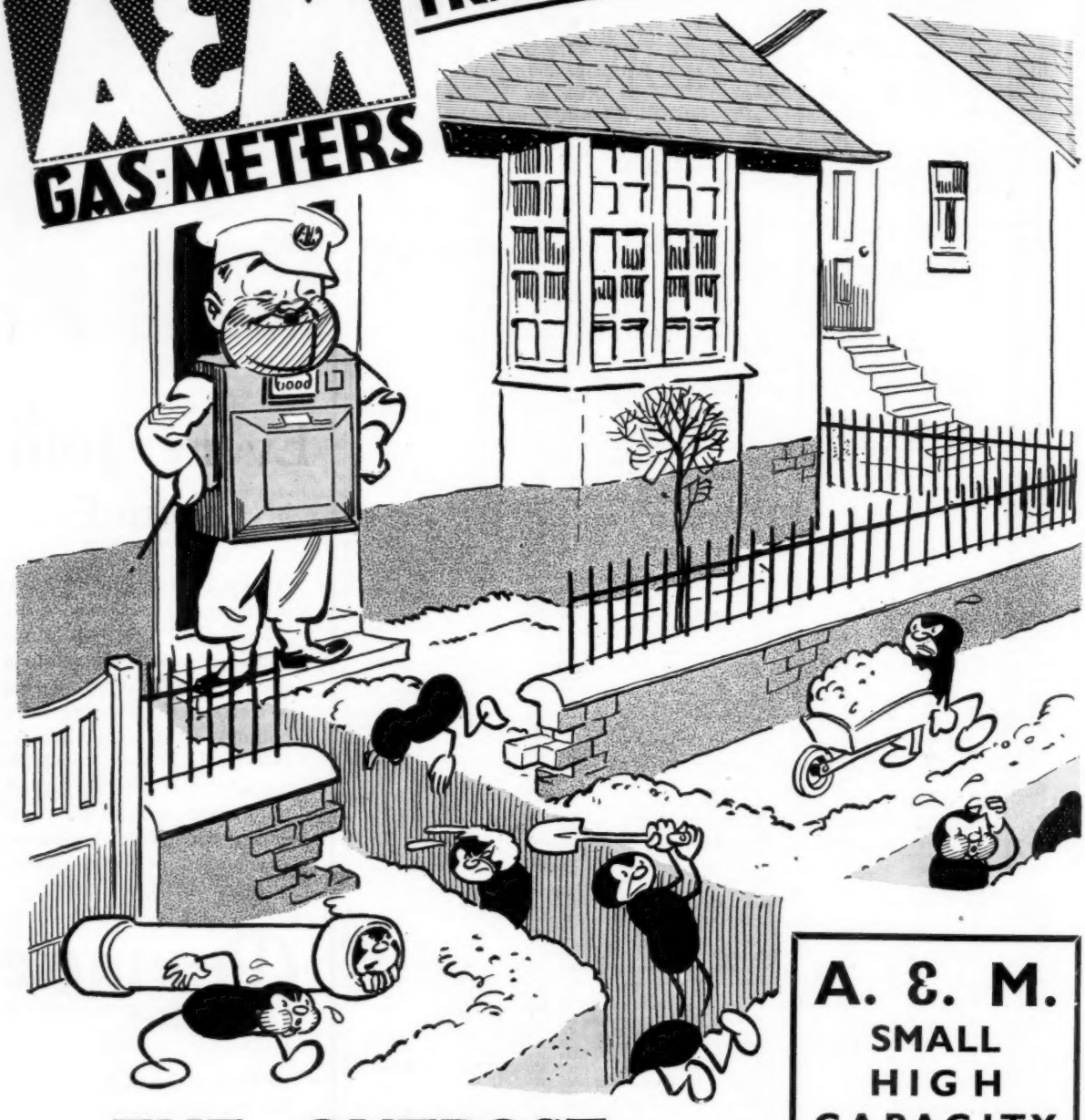
TRAIN·THE·THERMS



THE OUTPOST

Therms are going to occupy a great deal of new territory this year. If their operations are to be profitably controlled, Sergt. A. & M. Meters should be sent out with the advance party to receive them.

Not a therm escapes when the Sergt.'s in command.

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